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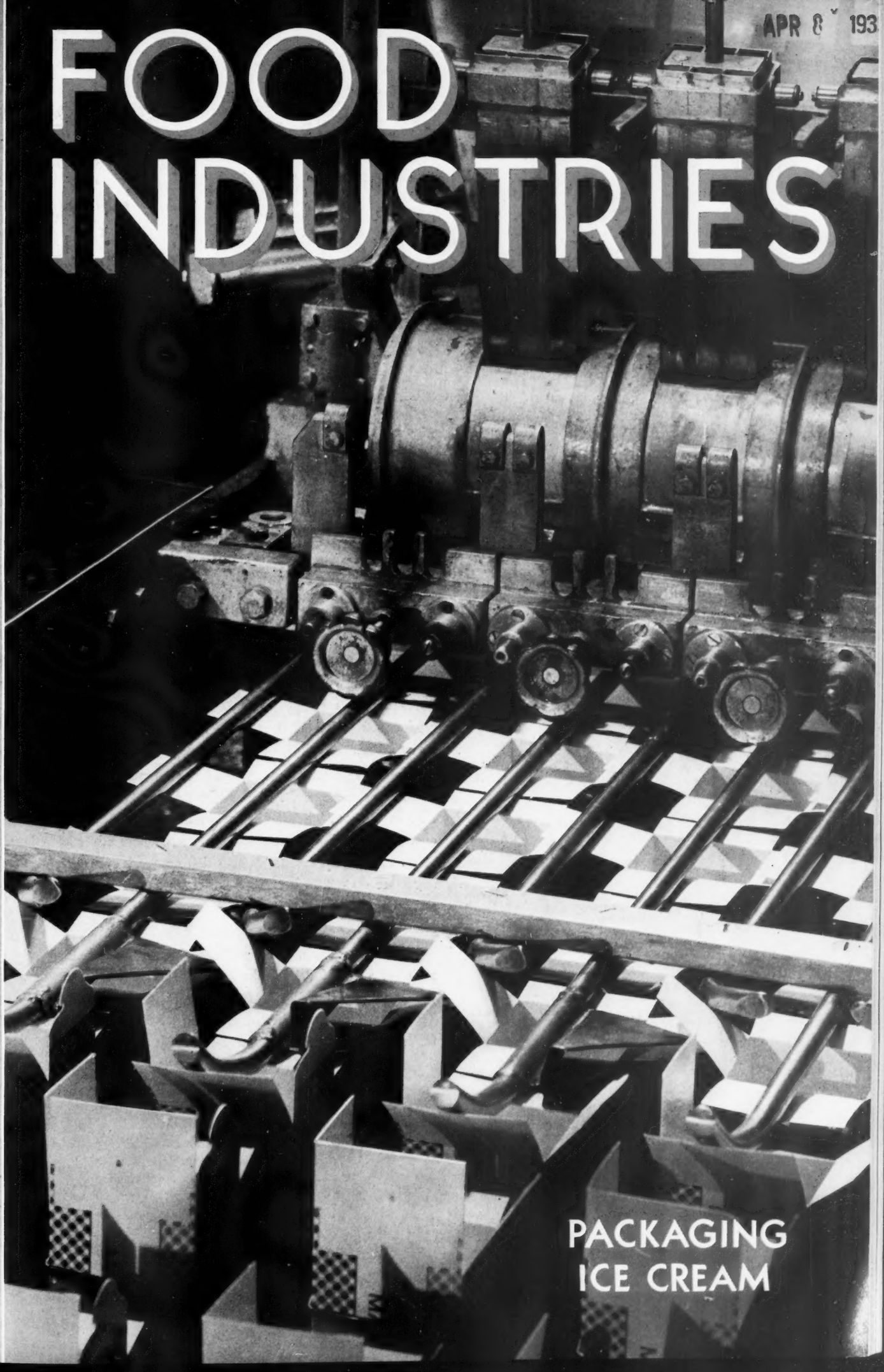
FOOD INDUSTRIES



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APRIL 1935

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

★

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

Established 1928—McGraw-Hill Publishing Company, Inc.

Vol. 7, No. 4

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Laurence V. Burton, Editor

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APRIL 1935

THE TALK OF THE INDUSTRY

PACKAGING NOTE: FOOD INDUSTRIES' prize for the poorest package of the month is awarded to a very well-known concern for its fluted mustard jar. As mustard packages go this particular jar would be rather attractive were it not labelled. But upon its fluting, which is placed so closely that one might say it is "microfluted," was pasted a spot label.

And of course the label stuck to the tops of only a few of the ridges and was decidedly scuffed and mussy.

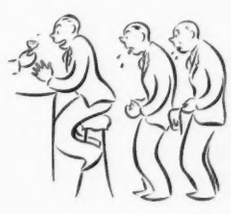
After spending the better part of a week at the packaging conferences and clinics receiving high inspiration, imagine our dismay and utter desolation at seeing such a package on the table of a swank restaurant.

OUR notes and memoranda keep piling up at an astonishing rate, particularly after a fortnight of doing nothing but attending Senate hearings and conventions, and remind us of the urge we have experienced to write an essay about that phenomenon of the New Ordeal—café fatigue. Of course, you will understand that fatigue is not used in the military sense.

Naturally such an essay would be out of place in so dignified a periodical as FOOD INDUSTRIES, which is ever devoted to the higher things of life. Nevertheless, there are aspects of the problem that manifest a discernible tie-in with problems of food manufacturing.

In the State of Illinois the law makes it necessary for all retail consumers to be seated, and it does not require a liberal interpretation to realize that anyone perched atop an upholstered stool who should thoughtlessly stretch a leg or put one foot on the floor is perpetrating a coarse and uncouth act. The fatigue, however, arises from the long wait for one's turn to climb to the right height to rest his elbows while partaking of old fashioned hospitality.

It reminds us of the pea harvesters' ball we once attended in an old Dutch tavern in the distant reaches of Wisconsin. In that quaint bygone time one needed either arms that were 10 ft. long or an inexhaustible patience to wait until those within reach had run out of money. As we recall it,



the cannery could not run for two days after the ball, thereby creating a new problem for the food manufacturer.

Perhaps it wasn't so new after all. Perhaps it was just another of those recurring problems. At any rate it seems more than likely that, had it not been for the fatiguing delays, at least 24 hours could have been clipped from the unscheduled shutdown of the factory. . . . Some day we will have to write an essay about it.

THERE is a food chemist, so we are informed, who has made such an exhaustive study of photochemical effects of different light waves on foodstuffs that photochemical reactions have become, in a manner of speaking, a part of his character. It is even said that he is never able to

pass a nut store without brooding over the technical iniquity of exposure to daylight of the freshly roasted nuts on display with no more protection from rancidity than that afforded by a large plate glass window. Passers by have heard him utter an agonized "Tch, tch," which translated from the language of chemistry to the native tongue of us humbler mortals, means "Tch, tch."

AMERICA'S No. 1 professional consumer, the tough boy from New Jersey, can always be counted on to furnish divertissement at any food and drug bill hearing. And we reflect that it is almost a pity that the bill will soon be enacted into law, for then there will be no more hearings and there can be no more of his tilts with red-faced Senators.

Never having been a United States Senator, we may perhaps over-

estimate the requisite shrewdness that we believe a senator should possess. It seems to us, however, that anyone with half an eye could have predicted the inevitable flare-up that must occur when the No. 1 professional consumer took the witness stand armed with about 15 lb. of documents. From the very leisurely manner in which he crossed his legs and made himself comfortable before the Senate subcommittee, it was certain that his maneuvers were directed toward creating an impasse, a situation like a one-man filibuster where it would be necessary to shut him off in order to permit any one else to be heard. If a whole day had been available for this one witness the outcome would have been the same, for he could have gone on indefinitely. The Senators should eye a professional consumer bearing voluminous documents with suspicion as great as that of the ancient worthy who suspected the Greeks bearing gifts.

After all, the professional consumer lives on issues—not on their settlements, for a settled issue is a dead issue and people do not pay their money to maintain fighters for a cause that no longer exists, no matter how mightily they may strive.

So when he has rambled on until double the allotted time is used up and he is finally asked to file the remainder of his remarks as in memorandum, his opportunity comes to exhibit his martyrdom, to denounce the chairman as an American Hitler, and thereby make the headlines in the daily press. What more precious issue than that could be dangled before a gullible clientele? What greater evidence could be needed to prove that Wall Street, or the predatory interests, were curtailing the right to speak of the representative of tens of thousands of consumers and peepul?

The issue lives and is augmented by more issues and still more issues! And gosh, how the money rolls in.

Our own idea of how to deal with the situation would be to give him a private hearing from which the public *and the press* would be excluded. The Senators could work in shifts and let him denounce *ad lib*. By keeping only one Senator on duty at once, it would not be very time-consuming, for one cannot make a speech to only one listener.

Why the Secrecy?

ONE suspects that Senator Copeland did not want the world to know that a hearing was called on his food and drug bill on March 2. Even interested Washington residents did not learn of the hearing until the preceding day.

But if there was any genuine attempt to hold the hearing with a minimum of advanced publicity, that effort was a total loss. It is doubtful if more people would have attended had a formal call been put out. In spite of the apparent secrecy, a total of 66 people filed requests for appearances at a hearing where the committee had hoped to jam it through in a single day.

It is well known that Senator Copeland wanted the bill reported favorably without a hearing. He was opposed by other members. The hearing was held and it was a Copeland day for S. 5. But why the secrecy?

Food Law Revision

THE food and drug bill is very nearly right as far as the food industries are concerned.

We are opposed to the revised language of Section 302(*i*), as it appears in Committee Print No. 3 and prefer the original language of S.5. This section corresponds to Section 7(*f*) of S.2800 of the previous Congress, and deals with the declaration of ingredients on the label. If no standard of identity has been prescribed for a food it will be necessary to state each ingredient on the label. Under the original language of S.5, the common names of the food ingredients could be filed with the Secretary—a procedure that safeguards public health and yet avoids disclosure of private formulas.

There are some misguided souls who believe Section 302(*i*) will protect sufferers from food allergy—a belief we most emphatically contradict. It will not, because it cannot. On the economic side, the possibility of fraud is amply taken care of by the section dealing with misbranding and false advertising.

The original language should be reinstated.

King Henry I

THE JOB of many a foreman, superintendent and plant manager is in grave danger of being wiped out by legislation now pending. It is doubtful if any despot or absolute monarch ever wielded more power over the affairs of his subjects than would be granted to the Secretary of Agriculture by S.1807, otherwise known as the AAA Amendments, now before Congress.

Hors d'Oeuvres

• *Marshall variety strawberries from the Pacific Northwest are finding new competition from Missionary strawberries grown in North Carolina. Some Eastern ice cream manufacturers like Missionaries much better than Marshalls.*

• After Washington gets through with the public utility companies, gossip has it that the dairy industry is to be investigated.

• *Collapse of the corner on pepper in England had a different outcome than the corner on tea in 1772-1773, which culminated in the Boston Tea Party.*

• Up to now there has been no test of code violations under the prepaid system now in effect under the macaroni and ice cream cone code. Maybe this plan actually works!

• *There now is available 1,000,000 lb. more beef than there would have been had the government not bought cattle which would have died on the range, according to Secretary Wallace. The same is held true for pigs, since the slaughter of 6,000,000 left more feed in drought areas. So, says the Secretary, don't blame me for any food shortage. Why, of course not!*

• Minnesota senators recently rushed through a $500,000 farm-relief appropriation after a horse, cow and pig had been brought before them. Could it be that senators speak the language of dumb animals? P-a-g-i-n-g Huey!

• *Consumers never are satisfied. A Puerto Rican got a pair of gloves out of a can of relief beef, and yet he beefed about it.*

• The Indians knew something of the methods of food processing, being able to concentrate maple sap without evaporating it. They let the water freeze out.

So astounding is the power to be conferred upon Secretary Henry A. Wallace by this bill that to dub him King Henry I would be no exaggeration.

Heretofore we have regarded Secretary Wallace as one of the saner men in Washington. We find it possible to agree with a good deal of his basic philosophy of the problems of agricultural surpluses. But we are in violent disagreement with the remedies which he proposes.

When he sponsors a bill to give him the power of life or death over every business utilizing agricultural commodities or producing any competitive commodity or product through licensing provisions it is pertinent to examine his qualifications as a business man. How much does he know about how to run a business —the source of the livelihood of all its employees? Surely he must needs be an able business man himself if he is to run the majority of the nation's business wisely. Mr. Wallace possesses many statesmanlike qualities, but his business ability is open to question. We believe that it does not justify placing in his hands discretionary power over the very existence of the nation's business.

To be sure, agriculture has its rights! So has the rest of the country! If there are too many farms in the land for a balanced economy, the opportunity for destruction of business is not the remedy.

Make no mistake about it: the creation of a dictatorship under an inexperienced business man means the early end of many a job for you production men.

The bill should be killed.

Harris and Ewing

MUST HAVE PUT IT OVER

The knowing wink by Chester C. Davis suggests that he and his chief got what they wanted. The AAA administrator and Secretary Wallace are just leaving a conference with the President.

More Drought

DROUGHT conditions continue in the same states that were afflicted in the summer of 1934. No more eloquent testimony to that unhappy state of affairs is needed than the existence of the vast dust storms west of the Missouri River in mid-March. Qualitative information of this character is, however, supplemented by a recent map of the U.S. Department of Agriculture showing very definitely how the snow and rainfall of the winter just ended, is amazingly like the conditions of the winter of 1933-34. This is particularly true in the regions of greatest deficiency.

In other words, the drought is repeating again. Whether it will persist throughout the coming planting and growing season is problematical. Management must, however, seriously consider such a possibility when programming the future of operations and commitments for supplies.

Our own amateur efforts at long-range weather forecasting indicate a repetition of the 1933-34 weather pattern. An abrupt change, however, is due in early summer which probably means that the drought will be broken then.

FOOD INDUSTRIES does not offer this as anything more than a more or less scientific guess. If it should prove to be a correct guess, it may be of interest to you to know that this forecast was made as long ago as February, 1933, at which time we calculated the probable weather trends up to 1940.

Evidently Secretary Wallace anticipates the prolongation of the drought. His recent order relaxing control over wheat production can have no other basis.

Non Partisan

FROM time to time we are charged that political bias colors these pages. For the benefit of those who share that criticism, may we suggest that critics carefully distinguish between economic and political views.

If a knowledge of the behavior of people and common sense business economics gained in the University of Hard Knocks is politics, the critics win. As a matter of fact, to paraphrase a saying of 1916, we don't care who licks the depression.

What Do You Mean, Safe?

"FRANKLY," writes one of our esteemed subscribers, "I do not like the negative quality or your title 'Avoid the Danger Period' (March FOOD INDUSTRIES, page 110), particularly when the Japs—or was it the Russians—have just assured us there is a 'Safe Period.'"

Distress in the Packing Industry

MEAT packers are all in more or less distress as a result of the shortage of livestock for slaughter. Some packing houses are now killing in one week only as many animals as they killed in a day, one short year ago.

Consumers are striking. They refuse to pay higher prices for meats. Those larger meat packers with well-balanced operations are able to operate without noticeable losses, but small packers are unable to recover their processing taxes. It's a deplorable situation. The plain fact is that there are not enough hogs to go around and keep up normal packing house employment.

By the time these words reach you, the plant personnel of the packing industry will be considerably reduced. Around the first of the year employment was about 89 per cent of nor-

mal. As a result of AAA and drought, employment will be reduced by about one-fourth to 67 per cent.

This reduction is not confined to the time-clock help either. Some good jobs are folding up. Some corporate cash reserves may not be large enough to last until livestock volume picks up. Economic planning is wonderful—if it works.

Expensive Food

WHAT is the most expensive commercial food? As far as our knowledge goes, the top figure goes to a product called Calipee of Turtle. It used to sell for $144 per dozen No. 1 tins.

New Process for Blackberries?

BLACKBERRY JAM with a walnut flavor but without walnuts is reported to have been made by a simple method by an old lady in Massachusetts. She strained the cooked berries, strained the juice, ran the pomace through a meat grinder with the peanut butter attachment, returned the mass to the juice and made jam.

The cracked seeds are said to contribute the walnut flavor. Does this have commercial possibilities?

CONSUMERS' CHAMPION

Dr. Thomas C. Blaisdell, Jr., new director of the consumers' division of National Emergency Council. Former lecturer on economics at Columbia University, he succeeds Willard Thorp, resigned.

The Packaging Conferences

FOR the first time since the packaging conferences were instituted five years ago, production as an essential function in the matter of packaging has been recognized and given a place on the program. One entire session was devoted to production and it was a great success. The audience on production day was as large and as interested as it was on any other day.

The American Management Association is to be complimented on this broader policy. We hope it will be continued.

Stabilized?

A CURIOUS clause in the beet sugar manufacturers' code requires the mills to compute their prices on a base price which is the New York quotation on refined, granulated, cane sugar, plus the hypothetical cost of railway transportation from New York or Philadelphia to destination. In this manner, the beet sugar industry is to be "stabilized."

And this is how it works. A food plant at Traverse City, Mich., uses about 450 tons of refined sugar annually, purchases cane sugar in New York and has it shipped by water at about a 20-cent freight rate, and gets it cheaper than beet sugar can be bought from producers in nearby Michigan towns. This is possible because the all-rail freight rates from New York must be added to the base price.

It must be great to be "stabilized."

Byproduct Follies

COMMENDABLE though it may be to utilize byproducts as a method of cost reduction, waste prevention, or avoiding an expensive method of getting rid of waste material, it is folly of the worst sort to attempt to set up a business where the entire volume depends on the continued existence of off-grade materials at a cheap price as the sole profitable basis of raw material. This is equally true when it comes to setting up a business where the sole raw material is to be a surplus which must be obtainable only at a salvage price in order for the business to succeed at all.

Very often it happens that such byproducts enjoy public demand and the volume of raw material needed is in excess of the amount that is available on a purely surplus price basis. When that time comes it is necessary to purchase raw materials at the market price for the main part of the crop or commodity. And then the competitive situation is entirely altered, frequently to the point where the salvage business can no longer operate.

This was the economic weakness of the 1930 ventures in frozen orange juice, quite apart from the technical difficulties involved. Frequently it also is a thorn in the side of the canners of grapefruit when the crop is short.

In one case, the manufacturers of cranberry sauce worked out the problem in a thoroughly comprehensive way. The manufacturer acts as the merchandising outlet for a large proportion of the cranberry crop. It is his duty to obtain the maximum return per barrel of cranberries produced by the grower. Hence the cranberries are either sold fresh or manufactured as economic conditions warrant, but it will be noted that they are manufactured only when the market price comes down to something that will permit profitable manufacturing.

In the recent past we have been approached by individuals who wanted to go into the manufacture of meat extract just because certain cuts of beef were rather low priced at that time. One can expostulate in vain, under such conditions. Nevertheless we again reiterate that all who intend to start up new operations on byproducts or salvaging of surplus raw materials, must consider the thing very thoroughly from the economic standpoint, particularly the long-range viewpoint, before they invest any money. Otherwise, it is very likely to be a losing proposition.

Big Changes Ahead

BE PREPARED for startling new technical developments in the field of food preservation. On some of these we have fairly complete information. On others we are in possession of only partial data. All of it is confidential at present, but will be revealed in due time. And FOOD INDUSTRIES will bring to you the complete story (provided that it makes sense when we get the full description plus the evidence of effectiveness).

This warning is issued lest anyone think that there is nothing new under the sun. When the new developments break there will come a time when there is no place for the man with fixed ideas and a self-satisfied outlook. In our opinion the next two years will see some of the greatest

CROWNED IN SHAKEUP

James M. Gleason, W. F. Schrafft & Sons Corp., Boston, who has been named head of the code authority of the candy manufacturing industry to replace George H. Williamson. The change, which divorces the code administration from National Confectioners' Association, was engineered by Pat J. Taft, who was forced to resign recently as managing director of the code authority.

technical developments the food industry has ever witnessed.

Solaristics

SOMEBODY is always stealing our stuff. This time it is the *Quarterly Journal of Economics* published by Harvard University. In November, 1934, that periodical carried a 52-page article on "Solar and Economic Relationships" by Dr. Carlos Mata.

FOOD INDUSTRIES discussed the subject in March, 1933, page 107, "How Can the Sun Affect Business?" Now that Harvard gives its approval to the respectability of the subject we suppose we can expect to see much more research in this field.

Flourine

FLOURINE is a natural constituent of phosphate rock and hence a common, almost universal, contaminant of phosphoric acid and phosphate chemicals. But manufacturing chemists are making definite progress; they are now providing food phosphates low in flourine content. Purchasers of phosphates will do well to watch this trend and insist on the purest grades commercially available at a reasonable price.

The function of flourine combined with calcium when taken into the human body has not been sufficiently studied to take it out of the realm of debatable knowledge. However, immediate compliance with too rigorous restrictions on flourine should not be expected as this problem is certainly not yet fully solved by phosphate makers. Splendid progress is being made and food manufacturers will, of course, want to take advantage of this, regardless of any regulatory action, which we hope may not be too drastic or prematurely imposed.

Still After A.B.C.

NON-A.&P. chain stores have *recommended* symbolic grading (fancy, choice and standard instead of A.B.C.), but have not adopted it. Because there is no formal proposal for amendment of the Canner's Code, NRA cannot call a hearing on the question.

Armin W. Riley, of NRA, expects that an amendment to the code will be proposed within a short time, and then there will be a public hearing with plenty of fireworks. Mr. Riley is going right ahead for A.B.C. grading on peas, beans, corn, tomatoes and grapefruit. He says that because codes are more flexible and more easily amended than legislation he feels that it will be to the benefit of the canning industry to try them out in codes before attempting to get A.B.C. into the new Food and Drug Law. But he is after A.B.C. in one place or the other.

Small Power Homogenizers

A noticeable trend in equipment design is the successful effort of certain manufacturers to develop small-size power-driven homogenizers. Plenty of large-capacity machines are available, but until quite recently there have been few machines of limited capacity.

Small machines are currently in demand for experimental work or small-scale operations. Any plant that uses big machines will usually find a little one a considerable economy.

"Buggy"

A HEALTH officer in a nearby state reports many consumer complaints about "buggy" macaroni under obscure brands, some of which are reputedly fictitious, and asks us the reason.

Simple: Old macaroni, bad housekeeping, receiving returned goods back into the plant, improper care of containers and packages, improper storage conditions, ineffective sealing of packages, no fumigation. No. 3 is the worst offender. Returned goods are nearly always buggy or mouldy and should never be permitted inside the plant. Keep them forever outside, or the plant will be literally alive with bugs.

FLOPS WANTED?

FREQUENTLY we are asked to recount the stories of plant methods that have failed. Up to now we have talked only about successes. Do you want to learn about the flops? If so, please write the editors and give us some idea of what you want to know about the flops. Nothing less than two hundred letters will jar loose a flop!

Why?

WHY cannot tea be sold in round containers? Why cannot coffee be sold in square containers? Those questions were seriously put to us last month. We don't know the answer.

ASSISTANT CHIEF

E. W. Gaumnitz, who has been placed second in command of the dairy section of AAA to assist A. H. Lauterbach. He has been with the dairy section since May, 1933, and before that was engaged in research on dairy and poultry products at the Bureau of Agricultural Economics.

The Food Industry Approves

S.5

Minor Modifications Requested

Underwood & Underwood

CAMPBELL and COPELAND . . . . entering the homestretch

SUBSTANTIAL approval of the Copeland bill, S.5, Committee Print No. 3, was registered at the hearings on March 2 and 8 by the spokesmen for consumers and the food processing industries as well as the Advertising Federation of America and the National Publishers Association. Suggestions for minor changes and modifications were made to clarify and strengthen the bill.

Large food manufacturers, represented by Charles Wesley Dunn, attorney for A.G.M.A., were favorable to the bill. He presented suggestions for clarifying and strengthening the measure and raised the question as to the constitutionality of Section 305 (*a*), Emergency Permit Control, and Section 707, Factory Inspection. Further proposals were to require a notice and hearing under Section 710 before criminal prosecution was begun; to permit a party to a condemnation proceeding to obtain a part of the government's sample and be informed of the method of analysis used in the case by the government laboratory; to require a court to determine if a criminal action is necessary to effectuate the purpose of the act before permitting a criminal suit.

Multiple seizure, Section 711 (*e*), he further suggested, should be modified to require the government to make one seizure in the district in which the defendant had his principal place of business, provided that any of his goods are available there, and that the trial should be in that district.

Mr. Dunn was opposed to any effort to transfer the enforcement of false advertising regulations from the Department of Agriculture to the Federal Trade Commission on the ground that the problem deserved criminal enforcement possibility, not merely a cease and desist order. This move was to forestall subsequent efforts to give FTC control over advertising.

ICE CREAM manufacturers, through R. C. Hibben, asked for uniform standards of quality of ice cream in all states, and requested the same exemption which butter now receives with respect to artificial color on the ground that fresh fruit flavors lose color, as a result of crystal formation during freezing.

Bakers, represented by Henry Stude, American Bakers Association, made the very valuable suggestion that a panel of food industry experts be provided from which two representatives of any given branch of the food industry would be drawn when the Committee on Food Standards meets as provided for in Section 703 (*b*). He expressed the belief that sufficiently detailed knowledge was not available in any two men to cover the entire food industry.

Exemption from declaration of colors in icings on cakes and cookies under Section 302 (*k*) was also asked. Mr. Stude pointed out the impossibility of a nation-wide standard of quality for baked goods under Section 303, because of geographical preferences, and showed how seriously complicated if not impossible labeling problems would arise under Section 302 (*i*).

Confectioners, represented by Stroud Jordan, expressed unqualified approval of S.5, as it then stood, but felt that certain changes had been made in committee print No. 3, that did not help the enforcement of the bill, and might lead to trouble. Section 302 (*i*) (the present version of the requirement—see 7 (*f*) of old S.2800—calling for a list of the ingredients except spices, flavors and colors) was far from a satisfactory provision, and he asked that the original language of S.5 which permits filing a list of ingredients be reinstated.

NORMAN DRAPER of the Institute of American Meat Packers asked that meat products now labelled under federal inspection be exempt from any provisions of the bill that coincide with the meat inspection law.

Alice Edwards, American Home Economics Association, hit at efforts to weaken enforcement provisions and endorsed multiple seizure as the most effective weapon in the law. She seems to be the only one carrying on Professor Tugwell's fight. She said the bill was a compromise now and consumers were not willing to make further concessions.

Consumers and Canners

By FLORENCE A. ARMSTRONG
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Twice, to be precise, we have been visited by professional consumer representatives of NRA and, although we suspect that their main purpose was to ascertain how we got that way on the labeling controversy, we report that the conferences were decorous and technical.

In our role of impresario of debates on pertinent subjects, we invited a reply to our expressed views on the controversy. In fact, we rashly invited NRA to tear our hide off, if it could be done within the limits of two pages. We hoped for something ferocious, about which we could become equally ferocious.

The discussion, however, turns out to be calm and dispassionate. Doctor Armstrong, whose views are here presented, pleads for statesmanship. We are in accord with this plea, however much we may disagree with her method of attaining more informative labeling. In presenting her viewpoint, we do not imply a change of attitude on our part.

—The Editors.

AMERICAN consumers have long sought for qualitative labeling of canned fruits and vegetables. Except for the unsatisfactory labels consumers regard canned fruits and vegetables with much friendliness. But the lack of information on the label as to relative quality is important to them. Various alternatives to the use of canned goods have been adopted, in varying degrees. Those alternatives which have become of much concern to canners may be listed briefly as follows: the use of fresh and quick-frozen products; the packing of canned products in glass containers; the opening of the can and inspection before purchase as now resorted to by large buyers; the canning of products at home; the setting up of many small community canneries for preserving the products of the gardens of the community.

What Consumers Want

ALL these alternatives appeal to the consumer, and trouble the canner. A cooperative agreement on the point at issue would offer advantages of great importance to canners and consumers. What is it that consumers request on the label?

The consumers' request may briefly be summarized as follows:

Quality of the contents, as at present stated on the label; name and style of the product; brief, unequivocal statement of the relative quality of the product, placing it on one of the various levels, as good, better, or best; easy legibility of the label for the sake of expedition in marketing. Consumers would not object to other useful, accurate information along broad lines.

Under the New Deal, with its realistic grasp of the fact that consumers are the key to the economic situation, the chance came to express the widespread but scattered demands in a concentrated manner. At the 1934 hearings on the Canning Code, important, large consumer organizations in the United States advised the canners —via the NRA—that they very much wanted the grade of the concealed contents of tin cans placed on the label, for use in selection.

Such an influential array of consumers making a cool, reasoned request for information about the quality of concealed goods prepared for their use made a deep impression on the country. It offered a remarkable opportunity for constructive action mutually beneficial to industry and to consumers, and in line with the need of the times for understanding between them. Their request could hardly be ignored by any well-organized industry. Nor has it been.

The 1935 national convention of the canning and allied industries devoted the sessions largely to consideration of the question as to how the industry could, by satisfying their consumers, capitalize on the immense potential good will at hand, and yet satisfy all elements in the industry and among their marketing allies, the wholesalers.

The Canners' Proposal

BUT, as an outcome, the canning industry resisted the consumers' demands as expressed, and countered with a proposal of what they call "descriptive labeling." According to the report of the canners' committee, "descriptive labeling" would place on the label such terms as those now used in describing each relative factor entering into each grade of each product, but it would not tell the consumer the grade itself. The plan is said to call for 143 different labels for one

style of canned corn alone! If canners really believe consumers want that kind of a thing, they know little about their consumers. It is claimed that "descriptive labeling" would give precise, accurate, complete and perfect description of the contents of the can. But as one trade association states: "Descriptive labeling is not sufficiently definite to assure instantaneous knowledge to consumers when making selections from the grocers' shelf."

To avoid a meaningless or a confusing lot of labels and to avoid constant trouble over misbranding, canners would seem to be facing a labeling problem of staggering proportions, beside which the consumers' reasoned request for disclosure of the grade on the label looks easy indeed.

The industry seems to dislike the thought of the use of A,B,C grades. Perhaps it feels that the NRA has already pre-empted the alphabetical field of labeling and that canners ought to explore new ground.

What consumers desire is a simple system, instantly intelligible, *including an intrinsically relative connotation.* The A,B,C, system offers just that. If the canners can offer a better system, more acceptable to themselves, and equally suitable for consumers, probably no one would object. But the lack of agreement goes deeper.

The Basis of the Resistance

ONLY impartial analysis of the whole situation can reveal the real basis of the industry's resistance to qualitative labeling. The industry has favored grading as a means of obtaining fairer competition and as a means of gaining wider consumer good will and confidence. The official action of canners, and official as well as individual opinion over a dozen years show that leaning very plainly. But grouped with the middlemen — principally the wholesale grocers who use their own labels— into a huge trade group, the scattered elements of resistance were fused into a belligerent opposition displaying the skilful use of the tactics of war. The grocery editor of the *N. Y. Journal of Commerce* thus describes their pugnacious leadership:

"The general staffs of the allied armies of canners and wholesale grocers held their councils and consolidated their battle lines for the remainder of the campaign."

And Mr. Paul S. Willis, the president of the American Grocers' Manufacturing Association, reported that relationships among the allies had "reached the closest and most friendly basis ever attained in the long dealings of the allied groups . . . Canners, manufacturers, and wholesale and retail distributors are now presenting a united front on the major problems confronting the trades—grading and labeling and food law revisions."

Such a picture of the solid phalanxes of the industry hardly represents the reality of the basic situation. For instance, the canners' very objections to qualitative labeling, as published or as given out in various ways, largely contradict each other, and thus cancel themselves out. While some canners say that the adoption of grades will cause packers to pack to the minimum of the grade and thus lower quality, others claim that it is impossible for canners to pack to grade at all. While some objectors say that consumers will pay absolutely no heed to the label, others claim that consumers will buy by grade alone, paying no attention to variations in quality within the grade, and thus drive some canners to the wall. While some say that inspection of pack will be so strict and rigid that it will kill all individual initiative in management, others as emphatically state that inspection will so vary from man to man and be so full of graft that it cannot possibly be effective. While to some, qualitative labeling means too extreme an advance to undertake, others call it a backward step. One could go on and on.

The significant complaints are those that do not cancel out. They remain the motivating objections of the industry, and merit close and respectful attention. At these points we find the crux of the matter. Here real statemanship is required.

The industry has three genuine fears: First, that the grades might not be practicable on the ground of having "ineffectually endeavored during the past twenty years in cooperation with federal officials to develop a practical plan for the vertical grade labeling of its products"; second, fear that minor variations from grade might involve the labeler in embarrassing and costly procedures in criminal court; and third, fear on the part of some owners of well-known trademarks and brand names that grades on the label would oust them from their present position of superior advantage.

Obviously, it would be presumptuous to point out to the statesmen of industry and government how they should solve these diplomatic problems. But consumers might ask a question on each of these troublesome points.

Is it not possible that a little more extensive cooperative work on the formulation of the three wide basic grades would develop, now that there is a general meeting ground provided by the code, into acceptable results?

As to prosecution under criminal statutes, might it not be possible for administrative provisions to be made for handling adjustments of minor or unintended infringement by civil processes, as in Canada? An investigation of the Canadian system has been issued by the Consumers' Advisory Board.

The third question that occurs to the impartial mind is whether the owners of "nationally advertised brands" in their fear of loss, are not overlooking the educational power of advertising to make superiority of product thoroughly familiar to the public?

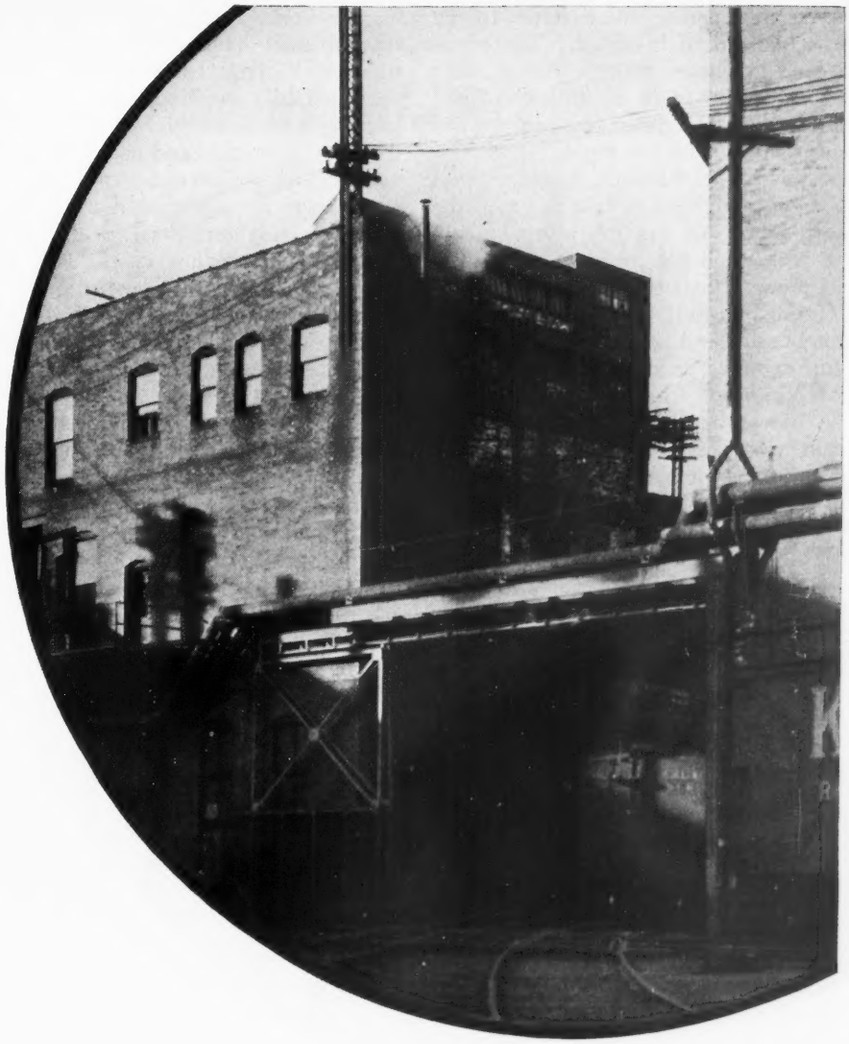
Basis for Agreement

THESE points of approach may be placed in juxtaposition to certain clear-cut points of agreement between the industry and consumers. First, all parties agree that the consumer has the right to have information about the contents of the can, in order to aid in accurate and expeditious selection but not to confuse and irritate with unrelated details. Second, on all sides exists the wide and old demand for more precise statement of quality. The industry's proposed system of labeling in order to give complete and precise information admittedly involves grading as a prerequisite to operation. Third, there exists very widespread objection to misrepresentation as injurious to all parties. Fourth, everyone wishes the consumer to be pleased.

These four points of agreement, combined with a statesmanlike handling of the three basic objections of the industry, in an atmosphere of sincerity and of good will toward consumers, offers a notable opportunity for removal of the barriers to a code of fair competition for the canning industry that will not injure the consumer nor ignore his best interests, and that, at the same time, will be of constructive value to the industry in obtaining fairer competitive practices, greater confidence of consumers, and greater volume of production.

Spare Parts for Personnel

By A. E. SINCLAIR
Plant Superintendent, Kingan & Co., Indianapolis, Ind.



TO HAVE an efficient plant force, it is necessary to include in the personnel an adequate number of "spare parts." In the constant wear and tear of everyday work, some employees fall by the wayside, either from sickness or inability to do the job assigned to them, and there must be at hand someone trained to step in and fill the gap.

Keeping of spare parts among plant personnel would seem to result in higher costs and may, in fact, unless care be exercised in handling them. But it is possible to have a person capable of clerical work doing unskilled labor, or a man working in the gang who can fill the foreman's shoes. And there should be laborers on the production line who can handle skilled or semi-skilled jobs if the occasion arises. Each of these spare personnel parts is producing and at the same time training for a job a little better than his own.

Before spare parts can be made available, it is necessary to bring into the plant men of high calibre. Several years ago, when all industry was moving along at top speed, it was difficult to get good men to come into the packing industry, and probably a similar situation existed in many other food industries. At that time, employees could see opportunities of bigger pay, faster advancement and perhaps less arduous tasks in other industries. Besides, many of them were not willing to spend the time and effort necessary to learn the packing industry. However, a better class has sought employment in the industry within the last year or two.

Kingan & Co. has procured better educated employees through an application-card system of hiring. From the cards we know, among other things, what a man's education has been, what previous experience he has had and what job he believes himself qualified to fill. From the several applicants we can choose a man well-suited to the job available and, perhaps, obtain an employee who will make a good spare part in his department.

All persons seeking employment with our company must go through the employment department, but when an exceptional man shows up, he is brought to the superintendent's department for further interview. When specially trained men, such as chemists and engineers, are desired, it is necessary to look for them.

Having brought into a plant a certain quota of employees who have the ambition and ability to work their way up, some form of training is advisable to fit them for better jobs and make them, meanwhile, suitable spare parts. Kingan & Co. offers its employees home-study courses, these being sponsored by the Institute of American Meat Packers in cooperation with the University of Chicago. This work is done in the evening under the direction of superintendents and with the aid of department heads. To give the courses a practical slant, the classroom work is supplemented by trips through the plant. Several promising young men have been discovered through these courses.

IN BUILDING spare parts and future managerial material for plant personnel, there arises the question as to who makes the better man, the college graduate or the man with less education. The college graduate is older and should have a greater sense of responsibility, but he may also

have more ideas that have to be knocked out of his head. The high-school graduate, though young, may be forced to work by financial difficulties and be filled with a keener desire to do the job right.

It is my contention, however, that the educated man is able to grasp the significance of his job more quickly than the man not fortunate enough to have had an education, therefore lending himself to more rapid advancement and better spare-part utilization, and it has been the experience of Kingan & Co. in the past year or so that educated men are willing to take whatever job they can get, then by their work make themselves fitted for better positions.

TO INDUCE educated men to come into the organization, the employment department should point out to them the future they may have in the business. Chemists, engineers, industrial relations men, merchandising experts and other specially trained men have plenty of opportunities. Chemists in a packing plant are constantly working to improve the keeping qualities of lard and further its uses. Chemists and bacteriologists are working on cures to improve and speed them up. Engineers are working on refrigeration to improve methods and reduce costs, and the same applies to power generation. Industrial relations men are called upon to map out the future of employer-employee relations, which is an important field. Merchandising specialists must work out new methods of merchandising and give them the acid test of practicability. Specialized men also have a chance to progress beyond the limits of their profession. As for men with a general education, they can work into the practical end of the business with equal opportunity.

The increasing number of educated young men being brought into the industry is sometimes looked upon with resentment by old-timers who happen to be narrow-minded in their outlook. The only way to handle this problem is to develop a spirit of teamwork. An old-timer quite frequently will give a young man the well-known "works," and in that case the youngster will be called upon to display some intestinal fortitude. If he does the dirty work without undue quibbling and tolerates the "riding," he eventually will win the old-timer over. Having done this, he has gained a fast friend, and the two of them, one with years of experience, the other with technical training, will make an effective team.

The packing industry, like the other food industries, not only offers opportunities for educated men, but it is stable, a factor that has come to be appreciated during the depression. This should tend to keep in the industry the capable men who join its ranks.

Production per Pound of Fuel

Plant No.	Product	Net Ounces of Food per lb. of Coal	Year
1	Catsup	10.8	1927
2	Catsup and canned tomatoes	24.8	1927
3	Canned peas and tomatoes	23.7	1927
4	Canned tomatoes	41.6	1927
5	Canned tomatoes, cherries and tomato pulp	30	1927
6	Canned tomatoes	47	1927
5	Catsup, pulp, tomatoes, cherries, gooseberries	45	1928
6	Tomatoes and pulp	30	1928

A USEFUL method of getting at the fuel cost in food production is that of calculating the production of food per pound of fuel. Day-to-day figures may exhibit considerable irregularity, but weekly, monthly and seasonal figures are very informative. Unless the plant makes only a single product, the total for all products represents a composite figure which needs care in its interpretation and use.

The table gives a few actual figures for an entire year obtained from six canning plants. Anyone will readily see that the figures vary all over the map, particularly because catsup and tomato pulp require a large amount of fuel for evaporation.

Plant No. 5 had no feedwater heaters when the first figures were obtained. Condensed steam from cooking operations was wasted to the sewer. In the following year, steam traps were installed, also a hotwell and a feedwater heater. Production rose from 30 oz. of food per lb. of coal in one year to 45 oz. in the following year as the result of these fuel economizers, a clean gain of 50 per cent. Translated into terms of carloads of coal, this gain in a small plant was a saving of a little more than two cars.

In larger plants, it is important to keep continuous records of the efficiency of operation on some such a basis. But to do it accurately, steam flowmeters should be put into the steam lines going to each department. A steam flowmeter, while not of itself a means for economizing on steam, gives an accurate record of the amount of steam used, which will indicate to alert management the practices that are economical and those that are wasteful.

A flowmeter cannot save steam any more than a thermometer can heat a house. But by correctly interpreting the indications of these instruments, the path toward savings is pointed out.

Cereals and Seeds Inhibit

Rancidity in Lard

Common problem of the meat packer, baker, and producer of deep-fat cooked foods is solved by use of natural occurring anti-oxidants.

By SIDNEY MUSHER

President Musher Foundation, Inc., New York, N. Y.

AS A MEANS of overcoming the ready tendency of lard to turn rancid it has been found that oil-bearing seeds and cereals possess marked anti-oxygenic properties (Process covered by U. S. Patents 1,816,338 and 1,841,842. Other domestic and foreign patents are pending.) These properties are present to the extent that relatively small percentages of the crushed or ground seeds will inhibit rancidity to a very marked degree when used in conjunction with lard.

Although lard has been tested in a number of different ways, the reported results are, in all cases, obtained by using the Swift Stability Apparatus; by means of which test air is bubbled through the lard at 208 deg. F. until such time as the odor given off by the samples is determined to be rancid and until the peroxide number reaches 20. In all instances the flours have been added to the lard while in liquid condition with the flours remaining in suspension. Mixtures of this kind can be used satisfactorily for all baking purposes.

It was first thought that the anti-oxygenic activity of raw soya flour, as indicated in Table I, might be directly related to the lecithin content or to the coloring matter of the soya flour, but subsequent experiments have shown that this relationship is not true. Instead, it has been found that such products as completely bleached and extracted soya flour will have marked anti-oxygenic properties, as may be noted from Table II.

The flour used in this case is bland in flavor and does not mask any of the fine freshly-rendered flavor and aroma of the lard. A product comprising 25 per cent of this special soya flour with lard is being made available to the bread baking industry by co-operation with the packers throughout the country. The finished product not only retains the full flavor of freshly-rendered lard, but at the same time possesses marked water absorption properties and acts as a freshening agent for bread, to the extent that this combined mixture will permit in excess of 3 per cent additional water absorption and water retention.

Just as soya flour is quite active in inhibiting the development of rancidity in lard, we find that other oil-bearing seeds, such as crushed peanuts, crushed sesame seed, crushed corn germ, and even their press-cakes, retain marked anti-oxygenic activity. For many bakery products, crushed sesame seed may be looked upon as being the most desirable for use because of its sweetness and nutty flavor. Table III indicates the activity of blanched crushed sesame seed.

IT HAS been found that in most cases protection against rancidity given by the presence of these seeds is proportionate to the amount of the seed which is used; example, 10 per cent will give approximately double the protection given by 5 per cent.

Whereas soya flour is recommended for lard used in bread baking, or crushed sesame seed where concentrated sweetness is desired, a cereal flour should be used for all other purposes where retention of flavor and anti-oxygenic activity alone are required. Either oats, hominy, barley, or other cereal may be employed satisfactorily, but oat flour is chosen for its availability, blandness of flavor, and absence of color. Ground wheat is low in effectiveness.

Oat flour is not as strong an anti-oxidant as soya or sesame, but lard treated with it may be used in pies, cakes, bread, and for all baking purposes where flavor and absence of rancidity alone are the objectives. The results of tests using decorticated and finely-milled oat flour in lard are given in Table IV.

Since it is estimated that 95 per cent of all lard goes for baking purposes, the presence of the flour will not be troublesome. This process nevertheless is equally applicable to the preparation of a 100 per cent fat product. For instance, when 5 per cent of soya flour is added to lard; the mixture held at 150 deg. F. for approximately 30 minutes; and the residuary flour filtered out, the anti-oxygenic activity remains as indicated by the data in Table V.

The anti-oxidant activity of oil-bearing seeds and cereals is not at all related to the kind or quantity of oil in that seed or cereal just as it is not related to the lecithin or the coloring matter content. Research into the structure of the flours is being continued to determine the cause of this activity, but it is felt that it may be some time before a satisfactory explanation is available. We do know that an unbruised peanut stored under optimal conditions may keep for years without deterioration and that deterioration begins immediately upon bruising or pressing. What we do is to reconstitute the anti-oxidants of the flour back into the fat to inhibit that deterioration.

Work is now being continued

on the preparation of concentrates from soya flour and from oat flour, which will permit the use of 0.2 to 0.3 per cent of the concentrate in place of 5 per cent of the flours. For all normal purposes, however, the flours themselves are recommended for ease of operation and economy.

The field of anti-oxidants for food products is limited. Many anti-oxidants are used in rubber, gasoline, and other inedible products, but these have no place in foodstuffs and are not permitted by the Food and Drug Administration or by the Bureau of Animal Industry as are the cereal and oil-bearing seed anti-oxidants described in this article.

Another advantage to these anti-oxidants is the cheapness of the materials used. The type of flour incorporated in the lard will range from $1\frac{1}{2}$ to $7\frac{1}{2}$ cents per pound, depending upon the source and quality.

For the entire bread-baking industry the use of soya flour in lard is recommended because there is accomplished not only the retention of aroma and of the freshly-rendered flavor of that lard, but there are unusual qualities of water absorption and freshening effects given to the finished bread.

For all purposes where water absorption is not a factor and where it is only desirable to obtain the full fresh qualities of the lard, a product like oat flour is recommended. This oat flour is quite bland in taste and acts merely as an anti-oxidant to insure to the consumer that the lard used will have retained its full aroma and flavor as originally rendered.

Wherever incorporation of the flours in the lard is not desired, it is recommended that a bag made of filter press cloth and containing crushed sesame seed, soya flour, or oat flour be suspended in the storage or processing tank, during which time a satisfactory infusion will take place giving the anti-oxygenic effect.

Thereupon the bag is withdrawn and the flour, after being removed from the bag, is added to lard for bakery purposes in which it remains as a part of the finished product. Under these conditions every pound of flour is used.

This work has been conducted in the field of fats, oils, and fat and oil-containing products. Similar work is being done on the application of these processes to the products of other industries, such as dairy products, including powdered whole milk; meat products, including bacon and chilled beef; other animal fats, including oleo oil and tallow; vegetable fats and oils; fish and fish oils, including mackerel, cod and halibut liver oils; potato chips; roasted nuts; soda crackers, and other fat-bearing foods.

Table I—Effect of Raw Soya Flour Upon Rancidity Development in Lard. (Not filtered)

Material tested	Elapsed time
Bleached lard (control)	1 hr. 30 min.
Lard + 1 per cent soya flour	2 hr. 45 min.
Lard + 2 per cent soya flour	5 hr. 15 min.
Lard + 3 per cent soya flour	7 hr. 0 min.
Lard + 4 per cent soya flour	12 hr. 15 min.
Lard + 5 per cent soya flour	16 hr. 15 min.
Lard + 10 per cent soya flour	47 hr. 45 min.
Prime steam lard (control)	5 hr. 0 min.
Lard + 5 per cent soya flour	35 hr. 0 min.
Lard + 10 per cent soya flour	65 hr. 0 min.

Table II—Effect of Fully Bleached and Extracted Soya Flour (Not filtered)

Material tested	Elapsed time
Prime steam lard (control)	5 hr. 0 min.
Lard + 10 per cent soya flour	9 hr. 0 min.
Lard + 25 per cent soya flour	20 hr. 0 min.

Table III—Effect of Blanched Crushed Sesame Seed Upon Rancidity Development in Lard. (Not filtered)

Material tested	Elapsed time
Prime steam lard (control)	5 hr. 0 min.
Lard + 5 per cent sesame seed	31 hr. 0 min.
Lard + 10 per cent sesame seed	49 hr. 0 min.

Table IV—Effect of Oat Flour Upon Rancidity Development in Lard. (Not filtered)

Material tested	Elapsed time
Bleached lard (control)	1 hr. 30 min.
Lard + 1 per cent oat flour	2 hr. 30 min.
Lard + 2 per cent oat flour	3 hr. 15 min.
Lard + 3 per cent oat flour	4 hr. 0 min.
Lard + 4 per cent oat flour	4 hr. 45 min.
Lard + 5 per cent oat flour	5 hr. 30 min.
Lard + 10 per cent oat flour	9 hr. 0 min.
Prime steam lard (control)	5 hr. 0 min.
Lard + 5 per cent oat flour	16 hr. 0 min.
Lard + 10 per cent oat flour	22 hr. 0 min.

Table V—Anti-oxygenic Activity of Various Flours Remaining in Lard After Filtering

Material tested	Elapsed time
Bleached lard (control)	1 hr. 30 min.
Lard + 5 per cent raw soya flour	9 hr. 0 min.
Lard + 10 per cent raw soya flour	14 hr. 45 min.
Lard + 5 per cent blanched crushed sesame seed	7 hr. 30 min.
Lard + 10 per cent blanched crushed sesame seed	13 hr. 0 min.
Lard + 5 per cent oat flour	3 hr. 0 min.
Lard + 10 per cent oat flour	6 hr. 15 min.

IN THE light of the investigations by Whipple and others who have determined that even partly rancid fats may be toxic, the results obtained by these natural occurring anti-oxidants are particularly significant.

Whipple conducted a series of feeding experiments in which rats were fed rations containing (a) no lard; (b) neutral lard; and (c) oxidized lard showing a peroxide value of 15 to 20. The rats fed no lard died of a fat-deficiency disease; those fed oxidized lard also died of a disease similar in symptoms to those on the lard free diet; whereas those fed fresh lard lived and grew normally.

Of greatest importance are the two statements by Whipple: "At present we can only say that slightly oxidized fat does not have the same nutritional value as neutral fat. It may be further pointed out that the oxidized fat used in these experiments is only slightly rancid, the odor is hardly perceptible, it is therefore possible that much fat ordinarily consumed under conditions where storage facilities are not optimal may be as rancid as that used in these studies" (*Oil and Soap,* Vol. 10, p. 228, 1933). "It is tentatively concluded that partly oxidized fat is unable to replace neutral fat in the diet, that there may be a toxic factor produced in the fat by oxidative processes" (*Am. Jour. Med. Sci.,* Vol. 187, p. 864, June, 1934).

It might be well to make the observation that the lard treated by these anti-oxidants is protected against deterioration up to the time of its use in consumer foods. Similar benefits may be given to the fat-containing bakery products by a slightly different use of the protective flours. Such applications will be discussed in the near future.

What the Meat Packer Looks For in

SUGAR

By C. ROBERT MOULTON
Evanston, Ill.

TO THE meat packer, sugar is more than a flavoring agent. It is a chemical which plays an important part in his curing processes. It is generally believed, and there is supporting evidence, that sugar helps to determine the type of bacteria which will grow in the pickling vats. That is to say, sugar, or sucrose in the language of chemists, discourages the growth of putrefactive types of bacteria and encourages the development of fermentative types. This, with possibly other changes, keeps the pickle solution acid instead of alkaline. Whether the source of this food for bacteria be cane or beet sugar is of no consequence, in spite of some opinion to the contrary.

While the packer generally uses the common commercial grades of refined sugar to cure his meats, other sugars have been employed experimentally. These include a good "second" cane sugar, a corn sugar and a raisin syrup.

Although the experiments were not sufficiently extensive to justify definite recommendations, they revealed that hams could be cured by the sweet-pickle method with any one of the sugars named. The quality of the product was the same in all cases. In curing bacon, however, the different sugars appeared to have varying effects on quality. Both raisin syrup and corn sugar seemed to produce a bacon which darkened too rapidly when fried. With beef hams, the raisin-syrup cure gave a better flavor and the corn-sugar cure a poorer flavor than did the cane-sugar cure. As for the dry-cured, hashed-ham trimmings, my experience shows that with corn sugar the product develops quite an abnormal color.

The results of these experiments are significant. They indicate clearly that not enough data exists on the action of sugars other than sucrose in the curing of meat. The evidence is just as clear—and practical plant experience bears this out—that cane and beet sugar may be used interchangeably. The advisability of using the light-brown, second cane sugar appears to depend chiefly upon price. If there is any material saving in the use of second sugar, it might pay to try it.

There is an opportunity, I believe, to develop a demand for meat products cured by special sugars, such as second sugar and raisin syrup. These sugars seem to give distinctive flavors, especially when used to dry-cure hashed meats. Carefully controlled experiments should be conducted, however, before hazarding a quantity of meat in such a venture.

NO MATTER what kind of "sugar" the packer buys, he should determine the cost in terms of the amount of sucrose, dextrose or other pure sugar which it contains. This involves an analysis of the product and the application of a correction factor that increases progressively from refined cane or beet sugar to a second sugar and finally to a syrup such as raisin syrup.

Other factors about sugar than the kind should be considered by meat packers. One is the bacterial content. The research laboratory of National Canners' Association has shown that sugar may carry enough bacteria to cause "flat sours" in certain canned products. But, unfortunately, no studies have been made which reveal the significance to the packer of the bacterial content of commercial sugars. Here is an opportunity for an enterprising experimenter. However, from my experience with canned, spiced hams and other cured, minced-pork products processed in cans at temperatures considerably below the sterilization point, I feel safe in predicting that the bacterial content of sugar is important with that type of product.

The physical condition of sugar, too, is important. For instance, second sugar, being moist, may cake if it dries out too much. Or it may get sticky if kept in a moist atmosphere. So care must be used in the selection of a storage space. Refined sugar should always be stored in a dry atmosphere. When used in dry curing, sugar should be dry so that it will adhere well to the meat. Both sugar and salt will draw moisture out of the meat, and the meat, in turn, will absorb the dissolved salt and sugar. Any quantity of water in sugar or salt affects the normal action. For the sweet-pickle process, however, the physical condition of sugar is of little importance, since it is dissolved in the brine. Lumps of large size are to be avoided, of course.

As with other materials for the food processor, the container in which sugar is shipped affects its physical condition. Sugar is bought in bags or barrels. The bags are generally of burlap and are cloth-lined, although the more expensive sugar sack may be used. The barrels are paper-lined. Since the packer uses large quantities of sugar and operates on a small margin of profit, he prefers inexpensive containers.

How Much Sugar in Fruit Jellies?

An Equation for the Calculation of Sugar Requirement and Jelly Yield*

By GEORGE L. BAKER

Assistant Chemist, Agriculture Experiment Station, University of Delaware, Newark, Del.

DURING the investigation of the quantity of sugar which a fruit-juice extraction of a certain viscosity will support as a tender jelly with 60 per cent added sugar, a set of values was obtained on grape and apple-juice extractions which were approximately the same as appear in the table.

Fruit Juice Viscosity-Sugar Relation in Jellies

Relative viscosity at 80 deg. F.	Parts sugar to be added for each part of juice by weight	Parts final weight jelly for each part of juice by weight
4	0.54	0.90
5	0.69	1.15
6	0.80	1.33
7	0.90	1.50
8	0.99	1.65
9	1.06	1.76
10	1.13	1.88
11	1.19	1.98
12	1.25	2.08
15	1.39	2.31

When the Curve A of the accompanying chart, for values of added sugar, as shown in the table, was drawn, it was found that the curve conformed to the general equation:

$$\log y = ax + b$$

where y equals the relative viscosity at 80 deg. F., and x equals the parts of sugar per part of juice by weight which must be added to an extraction of viscosity y. The value of the constants a and b are 0.675 and 0.236, respectively. The values in the above table have been calculated according to this formula.

The viscosities were measured with a viscosity device consisting of a bulb with a straight capillary tube attached, a modified form of the Ostwald pipette. Various modes of measuring the relative viscosity may be used if the constants a and b, occurring in the formula, are changed accordingly. Fruit-juice extractions should be brought into satisfactory pH range for the jellying condition previous to measuring the viscosity.

The constants given here are for our experimental kettles and are expected to vary slightly, depending on such variables as size and shape of kettles and the cooking time employed. At the present time, the values given here have been employed successfully in household recipes where a pound of juice was made into jelly, and in commercial recipes utilizing 100 lb. of extracted juice.

Curves B and C give quantities of sugar to be added in order to get firmer jellies. The constants a and b must be varied in order to produce these values. Curve B, which represents an approximate jelly strength of 40, requires the values for the constants to be:

$$a = 0.833 \qquad b = 0.195$$

Curve C, which represents nearer the commercial requirement of jelly strength, 50 and slightly above, requires the constant values:

$$a = 1 \qquad b = 0.154$$

The curves can be used by the practical jelly maker in the following manner: Suppose he has 60 lb. of a blackberry-juice extraction of pH 3.2 with a viscosity of 13 and he wishes to produce a jelly of about 50 strength. He takes a point opposite viscosity 13 on Curve C, and dropping a vertical line to the base line he can read off the parts of sugar per part juice by weight that he should add. In this case it is 0.95 parts sugar. Since he has 60 lb. of juice, he should add 60x0.95, or 57 lb. of sugar in order to get the firm jelly desired.

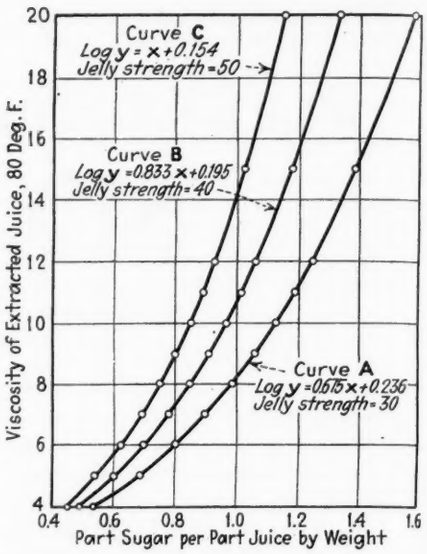
The quantity of jelly to be produced from an extracted fruit juice of a certain viscosity can be calculated from the same general formula, $\log y = ax + b$, by introducing another constant c for the per cent added sugar in the finished jelly. Letting z equal the parts by weight of finished jelly per part of juice, and substituting z for x in the above formula, we have

$$\log y = acz + b$$

The constant c probably will be varied from 0.6 to 0.65, depending upon the natural fruit sugars in the juice being employed; these constants represent 60 and 65 per cent added sugar, respectively. Upon increasing the percentage of added sugar in the finished jelly the constant a must be lowered in order to maintain the same strength of finished product.

This formula may be applied successfully to marmalades, jelly centers in candy manufacture, or other fruit products of a more or less jellylike consistency. The constant b will remain more or less unchanged, whereas a will increase as stronger jelly is required at a constant percentage of added sugar. For instance, if a fruit marmalade center for candy purposes is required, using a citrus marmalade, the value of a becomes about 1.2. Extracted fruit juices requiring added pectin as shown by the viscosity test, or on accout of dilution to develop milder flavors, may have the formula applied to them after the required quantity of pectin has been added.

The use of this formula in computing the sugar requirement and the resulting jelly yield of a fruit-juice extraction assures the user, whether he be making jelly in the home or in the factory, of a uniform strength of his jelly product. Soft, syrupy jelly, resulting from using too much sugar for the pectin requirement or from insufficient cooking, need no longer be made.



Typical curves, based on 60 per cent added sugar in final jelly, showing quantity of sugar to add for viscosity values of extracted fruit juice.

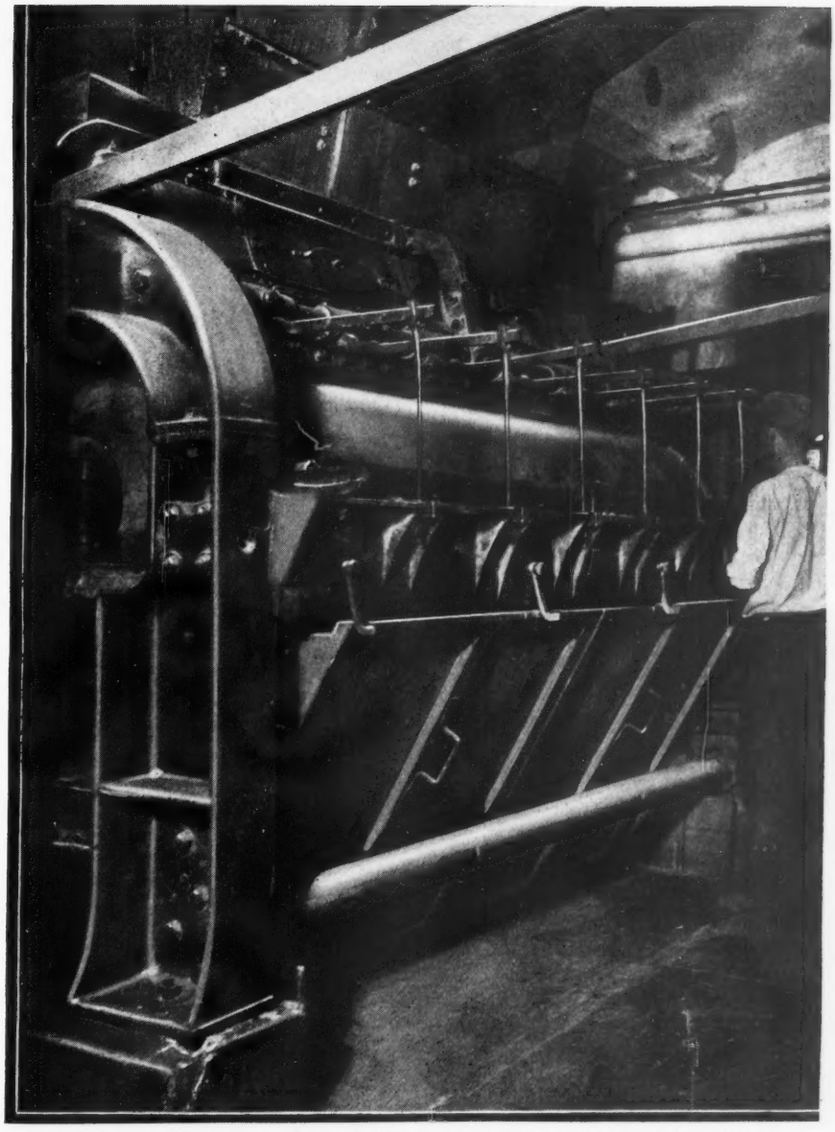
*Published with the approval of the Director, Delaware Agricultural Experiment Station.

[1]FOOD INDUSTRIES, Vol. 6 p. 305, July, 1934.

Stable Bran Flour

Schlueter process retains all constituents of grain, increases water absorption, and results in more digestible and nutritious bread.

By OTTO RAHN
Cornell University, Ithaca, N. Y.



Drum dryer used for removing volatile constitutents from bran during treatment under the Schlueter process.

FOOD refinement often produces one-sided foods. We usually eat the muscle only in meat, although we know the glands are important. Refined sugar is one of the purest chemicals available, but is not a complete food—only a food constituent. Salt is carefully purified, and then the iodide must be added again, because we who do not eat a sufficient quantity of fish and other iodine-containing foods need it. Though we brag of the immaculate whiteness of our daily bread, in many respects it is not what it used to be: it is not a food on which one could exist solely in an emergency. On a diet of most of the present white breads and water we would readily starve. We are inclined to sacrifice nutrition to appearance, and white bread, like sugar, is to a very great extent a one-sided food.

In the wheat grain, the constituents are not uniformly distributed. Most of the ash, fiber, protein and fat is in the outer layers and the germ, the innermost layers being largely starch.

By the milling process, one layer after another is gradually removed. The first few per cents contain all the dirt and dust, the hairs, and the outermost, glassy hull. Then comes the bran, containing the brownish hard layers which protect the inner parts of the grain. The bran includes the aleurone layer and usually the germ, and amounts to 25 or 30 per cent of the whole grain. As the grain is shaved off more and more, real flour makes its appearance; at first, it is slightly gray from the last bran particles, but soon it is perfectly white.

Bread was originally made only from ground whole grain. It is hardly 100 years ago that the separation of bran was introduced. This was done for two reasons: first, the general tendency for refinements to be popular; and second, the increasing division of labor. Supply of food to larger cities made necessary the grinding of large amounts of grain. The grain, however, did not keep well. It became bitter and rancid. To correct this difficulty, it was necessary to separate the unstable oil-containing germ from the stable flour. Partly for these reasons the bran was also removed.

While white wheat bread and even white rye bread became popular, food experts realized that the food value was not the same as before. Many efforts have been made to mix the bran and even the germ extractives with the flour and produce a bread with a more natural food balance. Graham bread, whole wheat bread, bran flakes represent some of the attempts made in the United States to compensate for the decrease in nutrition arising from the manufacture of bread from highly milled white flour.

Adding bran to white flour corrects the physical deficiencies to a great ex-

tent, but not the chemical deficiencies, as the food constituents of the bran are largely indigestible. The proteins, fats and vitamins are so thoroughly encased in hard cellulose membranes that human digestive processes are not able to make use of them, although grain-eating animals can.

A GERMAN miller and baker, Theodor Schlueter, conceived the idea that the food value in the bran could be made available by some process. He first tried fine grinding, but without success. Next he steeped the bran in hot water and treated it for some time with moist heat. Under this treatment, the hard cell walls began to soften and tear, and microscopically-small slits to appear in the rigid structure of the various layers of the bran.

This bran digestion with hot water began in Germany before the World War, and today Schlueter bread can be bought all over the country. In Germany, bread means rye bread, and Schlueter bread is rye bread, differing from other whole-grain ryes only by this bran treatment. The same treatment is also possible with wheat and I have found very tasty Schlueter wheat bread.

Bran treatment by this process is quite simple. The first of the bran, about 7 per cent, contains some dirt and is discarded. The following bran, up to 25 or 30 per cent of the grain, is used. Referring to the diagram, it is first steeped in warm water to a thin, pasty mass, in a rotating drum, or digestor, where it is kept at moderate temperatures for several hours. This treatment destroys the peroxidases, but does not affect the other enzymes, nor the vitamins B and D. At the same time, the cellulose membranes of the cells are sufficiently hydrolyzed to make the cell contents more readily digestible.

Next the volatile compounds that cause off-flavors are removed. For rye bran, the simple drying of the treated material on drum dryers, as shown in the diagram, is sufficient.

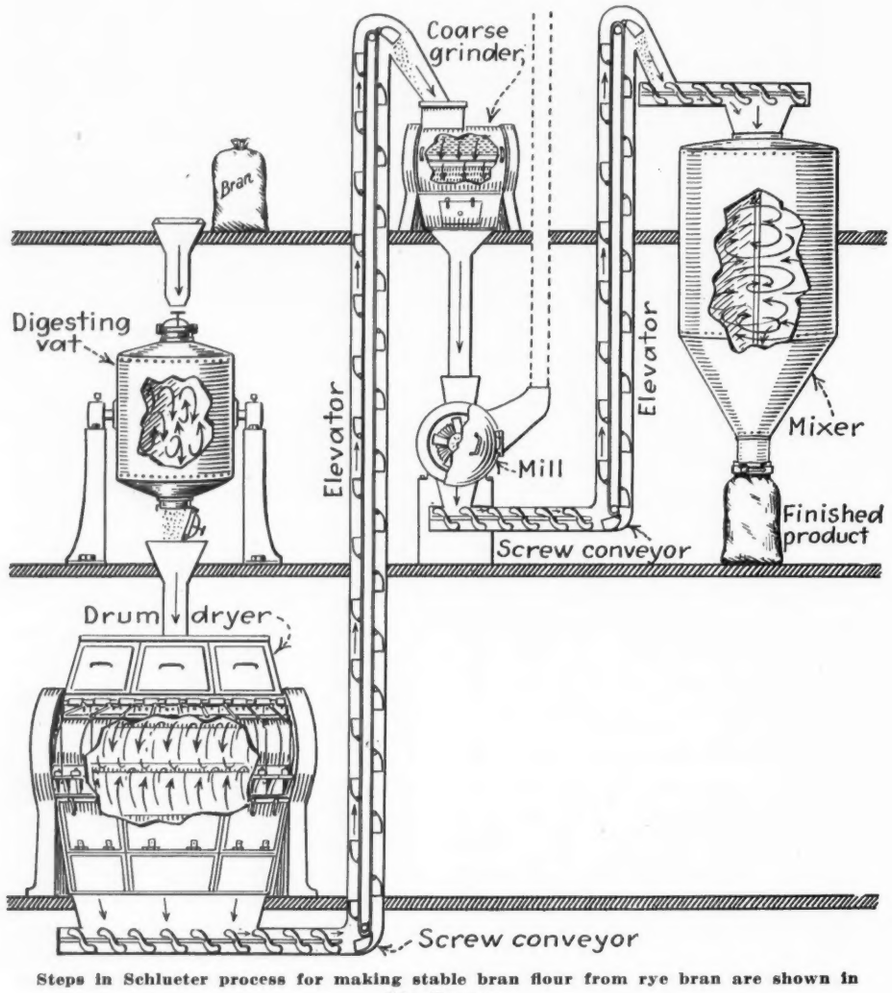
The dried bran is then passed through a crusher, and next through a fine grinding mill of the hammer, or disintegrator type. After passing through a mixer to assure uniformity, the bran flour is bagged for shipment.

In price, this bran flour is not higher in Germany than regular flour, when conditions are normal. Just now, government regulations have raised its price considerably.

Bran treated by this process keeps indefinitely, in contrast to the untreated bran which quickly becomes stale and rancid. All the Schlueter bran flour is made in one factory, at Dresden. It is sold to the bakers, who mix it with rye flour in proportions of about 1 part bran flour to 3 parts rye flour, approximating the original composition of the grain.

BAKERS like this Schlueter flour, because it absorbs considerably more water than regular flour or bran. Thus, when 20 gm. of bran are mixed with 100 cc. of water at 25 deg. C., and 15 cc. of the mixture centrifuged at 3,500 r.p.m. for ten minutes, the amount of sediment with untreated bran was 5.7, with Schlueter bran flour it was 7.0. This means an increase in water absorption capacity of 23 per cent. Consequently, Schlueter flour makes an improved bread, of better structure. It does not dry so easily after slicing.

German Schlueter bread is a sour-dough bread with a dark-brown, shiny crust and is the color of light chocolate, slightly darker than other whole grain ryes, not gray, but distinctly brown. Its success has been great in other rye-eating countries, especially Poland, Denmark, and Czechoslovakia, which import it from Germany. A factory for the production of the flour is now being erected in Copenhagen. In the United States and in Canada the process is protected by recent patents. This process can also be used to remove the bitter constituents of wheat germs without damage to the vitamins.

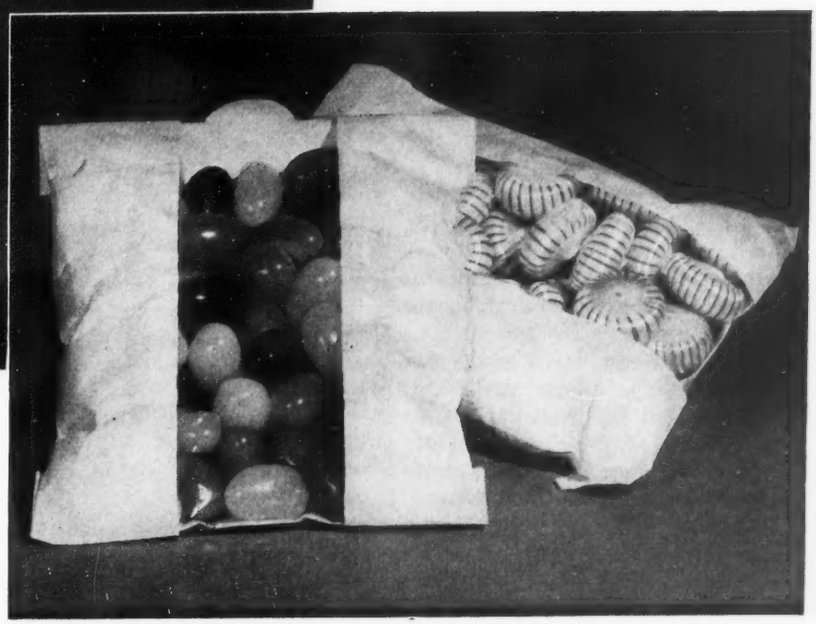


Steps in Schlueter process for making stable bran flour from rye bran are shown in this diagram.

Paper Bags

Multi-wall kraft paper bags cut shipping costs and protect products. Specialty bags give visibility.

Bags having type of overlap seal illustrated above are emptied through remaining truncated portion which serves as a pouring funnel.



Specialty paper bags having a strip of transparent film running across one face give visibility to contents at low cost.

KRAFT paper bags, long known to the retail food trade as containers for dry bulk commodities in consumer lots, have within the past four years grown in strength and industrial usefulness.

For retail use they are generally single-walled and have a maximum capacity of a peck of potatoes or apples. As an industrial container they are multi-walled—two to six thicknesses—have from 25 to 100 lb. capacity, and serve as shipping containers for small unit packages or as shipping bags for dry, granular or powdered commodities such as cocoa, flour, sugar, salt and soda.

As shipping containers of small unit packages these bags have been adopted by leaders in the coffee industry to replace corrugated paper cases for 1-lb. bags. This use of open-mouth kraft paper bags has been fostered by the Union Bag & Paper Co., New York, N. Y., for about 2½ years with the result that at the end of the first two years more than 2,000,000 of these two-ply bags containing as many as 30,000,000 1-lb. bags of coffee had been shipped to all parts of the country by freight, express, motor truck, steamship, and railroad with much handling by small mechanical or hand-operated trucks. The results of the shipping tests were sufficient to win approval of the bags by the Consolidated Freight Classification Committee..

The bags are manufactured in sizes to handle 12 and 24 1-lb. bags and are of the flat bag construction which forms a rectangular-shaped bottom. When filled they are rectangular in the three dimensions, are closed by folding laps with or without glue, and are taped as are corrugated paper cases. Their two-ply walls are of heavy-duty 70-lb. kraft stock and spot-glued to prevent separation

The multi-wall "valve" paper bags

are composed of several independent sheets of kraft paper sewed together across top and bottom. Bags of 25-lb. capacity are usually composed of double walls; those of 50-lb. capacity are usually of triple walls; and those of 100-lb. capacity range from four to six-wall construction depending upon what is to be packed in the bags, upon the basis weight of the paper used, and upon how the bags are to be handled. The lighter weight bags are supplied for direct carload shipment of such commodities as flour or sugar; somewhat heavier bags for l.c.l. shipments, and heaviest bags for water shipments.

Both ends of the valve bag are closed by sewing through a tough, crepe-paper reinforcing strip to prevent the stitches tearing through the kraft paper walls. This closing is done before the bags leave the factory in which they are made. In one corner a 2 to 3-in. opening, fitted with a crepe kraft "sleeve," is left to serve as the "valve" through which each bag is filled. At the flour mill or sugar refinery the nozzle of the filling machine is inserted into this valve opening with the sleeve extended and surrounding the upper portion of the filling spout. When filled the bag is slipped off the nozzle and the valve is closed by tucking in the sleeve in such a way that pressure of the contents of the bag upon the inside of the valve walls prevents leaking or sifting.

Used for several years in the cement industry these bags, under the test direction of St. Regis Paper Co., New York, N. Y., were first tried out in a Canadian flour mill in the summer of 1931. This mill is now using the bags in 24, 49, and 98-lb. sizes.

The 24-lb. bags are comprised of two thicknesses of 50-lb. kraft. The outer sheet is of bleached kraft and sometimes the inner sheet is of blue kraft to emphasize the whiteness of the flour. For the 49-lb. bags two sheets of 40-lb. and one sheet of 50-lb. kraft are generally used. For carload shipments of flour or sugar, three 40-lb. and one 50-lb. kraft, natural color are used, whereas for l.c.l. shipments four 40-lb. and one 50-lb. sheets are most likely to be used.

Since then flour mills in the United States have adopted the 24½-lb. and the 98-lb. bags having the same wall thickness as those used in Canada. The 49-lb. size is not yet in much demand. Sugar refineries are adopting the 100-lb. bag for both beet and cane sugar but as yet only the beet sugar interests use the 25 and the 50-lb. sizes. The 25-lb. sugar bag is made up of three 50-lb. kraft sheets. The outer sheet at present is white-coated and sometimes the inner sheet is blue in color. Experiments are being conducted to get other outer sheets that will be as satisfactory as white-coated kraft and less expensive. Three 40-lb. and one 50-lb. sheets comprise the 50-lb. bag and four 50-lb. and one 60-lb., or five 40-lb. and one 50-lb., sheets make up the 100-lb. sugar bags. These larger capacity bags are of natural kraft.

Loading of 1-lb. coffee packages into duplex heavy-duty paper shipping bags is made easier by smooth walled box forms at end of packing table.

FOR several years refineries have been using open-mouthed paper-lined jute bags for soft sugars, particularly on the Pacific Coast and for thermophile-free sugar. These multi-wall paper liners consisted generally of two thicknesses of natural kraft and one thickness of waxed paper.

Also within the past 2½ years open-mouthed heavy-duty multi-wall paper bags have been introduced to the cocoa, flour, sugar, salt and soda manufacturers by Bagpak, Inc., New York, N. Y. These open-mouth bags also run from three to six thicknesses of kraft paper and are sewed across the bottom before filling and across the top after filling. To prevent the threads from tearing through the paper walls the stitches of thick soft cord are held from contact with the paper by a cord of twisted kraft paper which runs the full length of the seams between the stitching threads and the paper walls. As an added precaution against leakage by sifting a binding of crepe paper sealing tape is glued over the seams and exposed ends of the bags and compressed into place by matched steel rollers; bottom seam is taped when bag is made.

Type of material packed in these bags and the conditions under which they are to be handled and stored determine the number of sheets and the basis weight of the kraft paper used. They have a 100-lb. capacity and are easily handled.

Use of both the "valve" and the "open-mouth" types of multi-wall heavy duty bags has been facilitated by weighing and filling machines designed particularly for use with each style of bag. In the case of the open-mouth bag a stitching and sealing machine has also been perfected. This closing machine may be semi or full-automatic in its action depending upon the plant layout.

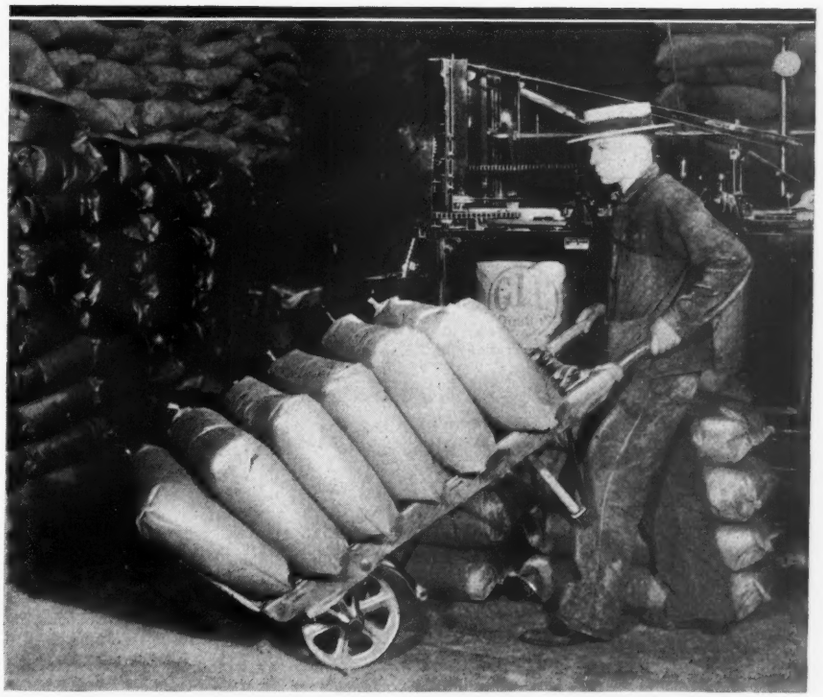
Packers of free and semi-free flowing commodities in consumer packages for retail stores have found the new "Deltaseal" of Bemis Bros. Bag Co., Minneapolis, Minn., a good-will getter. The bag is of the same quality papers commonly used for 1-lb. coffee packages, 2 to 12-lb. flour bags, and 2 to 5-lb. cornmeal bags, having a twisted wire or heavy string tie closure. When closed with a Deltaseal these bags become rectangular solids in shape and will stack on any face or end. The top lap of the seal is formed so that when it is pulled loose according to instructions on the package and cut along a dotted line its truncated portion serves as an emptying funnel or spout for the contents of the bag.

THE "Deltaseal," as well as the open-mouth 3½ and 7-lb. paper bags, have become particularly popular on the New York City retail market for flour during the past three

months. Previously, cotton bags dominated the market. In fact as late as one year ago paper bags were practically unknown in the New York City market.

Expanding markets for special cake flours and prepared mixes have stimulated Bemis Bros. Bag Co. to introduce seam-cemented, bottom and top closure taped paper-lined cotton bags. The cake flour bags are lined with bleached kraft and the bond between the cloth and the paper is made secure by a special flexible, moisture-resisting adhesive which is odorless, tasteless, and otherwise non-injurious to food products. The prepared mix bag is parchment-paper lined. Otherwise it is of the same construction as the cake flour bag. Both bags are pest-resisting and are available in 5, 10, 25, 50 and 100-lb. capacities.

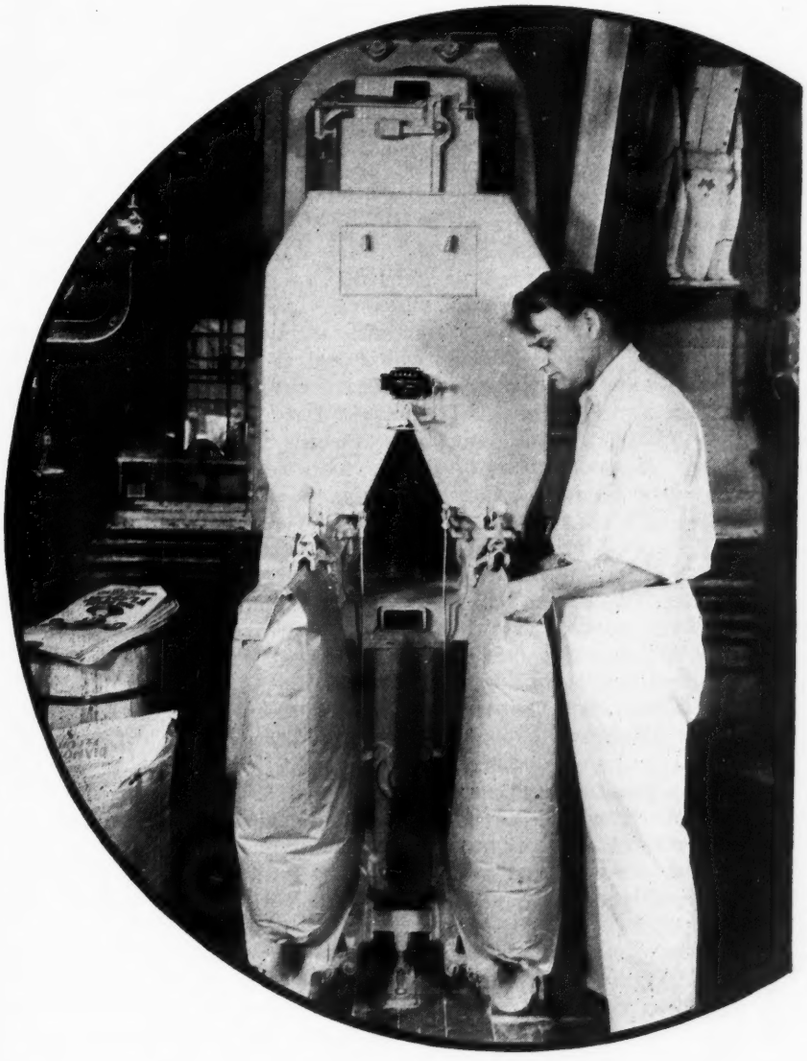
Specialty bags such as those formed entirely or in part from transparent wrapping materials have within the past several months been made on regular bag making machines by companies heretofore known primarily as paper bag manufacturers.



Open-mouthed multi-wall paper bags are machine sewed and taped across top after filling. They may then be trucked and stacked without danger of sifting.

The number of thicknesses of material on walls and bottom of these bags depend upon the capacity of the bag, the commodity to be packed in it, and the weight of the transparent material used. Such bags are so new that their use is quite limited at the present time. More importance is attached to the production of small volume bags having one or two panels of transparent material in the sides of the usual type of paper bags.

BAGS decorated with printing or lithographing, and made from transparent cellulose materials, have found wide use for food packaging in the past five years. These bags are usually from a few ounces to 2 lb. in capacity and are made by approximately 25 companies engaged in the fabrication of bags for general use.



Valve-type multi-wall paper bags are machine sewed on both ends before filling. Nozzle of filling machine fits into sleeve valve in bottom of bag. After filling the sleeve is tucked in to form a sifting-resistant seal for the bags.

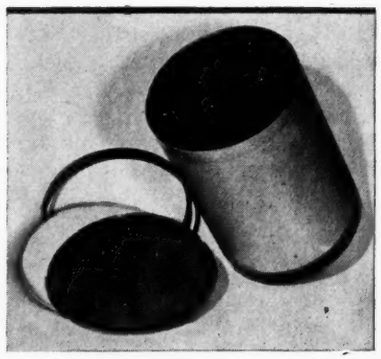
Non-Metal Shipping Containers

All-fiber containers and knocked-down shipping cases show saving in labor and storage as well as in shipping expense

IN AN EFFORT to meet competitive prices through reduction in production, storage, and shipping costs, food manufacturers during the past five years have shown an increased interest in easily handled and economically stored light-weight shipping containers.

Manufacturers of fiber containers have met this interest by, among other things, the introduction of all-fiber drums ranging from 1 to 32 gal. capacities. Those made by the Master Package Corp., Owen, Wis., have standard weight capacities of 125 lb. in the $10\frac{3}{4}$ and $13\frac{1}{4}$ in. diameters, 150 lb. in the $15\frac{3}{4}$ in. diameter, and 200 lb. in the 17 in. diameter drums. However, the construction of these drums can be varied in order to meet requirements of weight capacity from 55 to 375 lb., in any of the four diameter sizes. The Container Co., Van Wert, Ohio, also is a manufacturer of all-fiber shipping drums and there are undoubtedly others.

In the tapered style, these containers are available in 13, 15, 20 and 22 gal. capacities, capable of carrying a weight of 125 lb. The tapered containers stack so as to give an 80 per cent saving in storage space required for straight-sided containers having the same capacity. Straight-sided drums of varying diameters nest to give a saving in storage space if containers of different capacities are used. These all-fiber containers are used for prepared flours, powdered cocoa mixtures, coffee, spices, coconut, icing mixes, and sugar. Special linings make the containers grease- and moisture-resisting.



Special wax lining and waxed paper covered ends make fiber drums capable of carrying liquids. Asphalt layer in the laminated paper walls and high calendered and kraft-wrapped outer layer prevent passage of moisture through container walls.

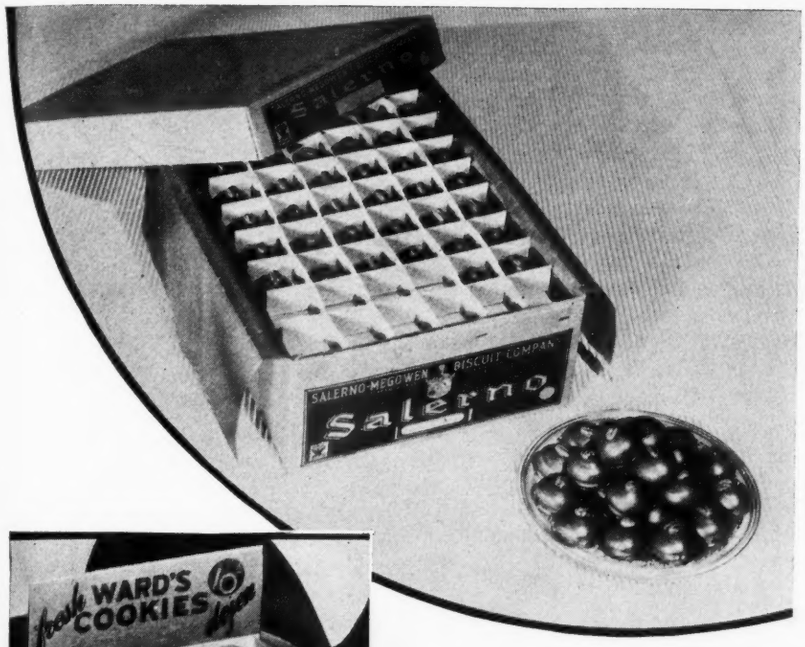
Lids for solid fiber beer cases may be divided in the middle or may cover the entire case. In either instance it is a part of the blank from which the case is formed.

FOR bulk lots of fruit juices or fresh fruits in sugar syrup Carpenter Container Co., Inc., Brooklyn N. Y., has developed a container which is claimed to be leak-proof. It is constructed from laminated fiber board with a layer of odorless asphalt, lined with a specially prepared and applied wax coating, and fitted with wooden top and bottom ends whose inner surfaces are covered with heavy waxed paper. Pressure is required to force these ends into place and make an air- and water-tight seal for the container. Metal end-bands both protect the edges of the container and serve to hold the ends firmly in place. Such containers are available in capacities ranging from 1 to 30 gal. and meet the I.C.C. requirements of 375 lb. net weight capacity.

All of these fiber containers have smooth, sanitary, and metal-free walls; are from 25 to 40 per cent lighter in weight than non-fiber containers of same capacity; and make unnecessary the use of sift-proof inner liners.

With the introduction of frozen foods and the packing of fresh fruits, particularly apples, in partitioned cases for storage, corrugated paper cases have found new markets. Shipping and packing cases for these new markets as well as for the baking and frozen orange juice industries entailed the use of moisture-resisting board and sealing tape in the making of the cases; development of double-walled board to increase their insulation value; and more advantageous use of kraft and jute stock in the construction of the cases to get the desired strength at a minimum weight and cost.

So well have the conditions been met that corrugated paper cases have become the universally used shipping container for packaged frozen foods.



Corrugated paper cases have also been adopted for bulk packing of bakery products. At least one manufacturer has carried the design of these containers to the point that they have valuable reuse for display purposes.

Also asphalt-lined cases, of Robert Gair Co. manufacture, have made possible safe handling and storage of foods through extreme range of temperatures and humidities. This performance is particularly important in the summer time when perishable or frozen foods are removed from low temperature storage. Condensation of atmospheric moisture on the surface of the case does not deteriorate the case nor penetrate into its contents and the change in temperature of the contents is so slow that refrigerating temperatures inside the containers persist long after the packages are removed from refrigerated storage.

These results have been obtained partly by the use of odorless asphalt layer in container wall construction, partly by the high calender and water-resisting finish put on the stock comprising the outer layer of the cases, partly by the water-resisting sealing tapes which also protect the underlying adhesives against moisture absorption, and in some cases by adopting double-wall board construction.

Dairy concerns, such as National Dairy Products Corp., use a single wall corrugated paper container with two double-wall liners as insulated delivery package for ice cream; even for quantities up to 5 gal. A cake of solid CO_2 on the top of the ice cream container is the refrigerant.

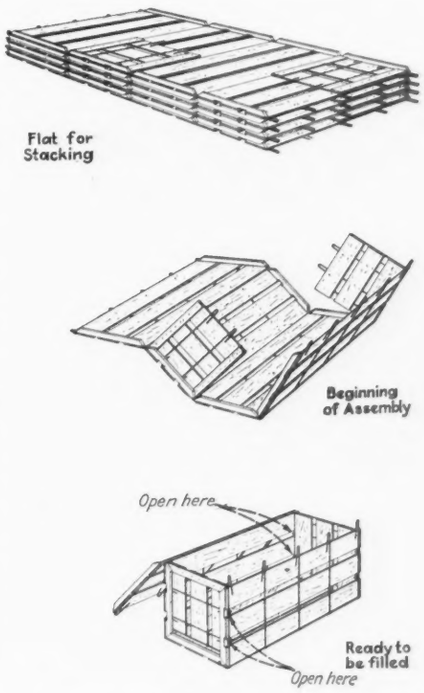
BEFORE the prohibition period, the wooden case was traditional with the brewing industry, but with the return of legal beer and its marketing through retail grocery stores, corrugated paper beer cases have been widely adopted (FOOD INDUSTRIES, August, 1934, pages 358-359). Of more durable construction are beer cases made from waterproofed solid fiber board, such as the returnable case made by the Rockford Fibre Container Co., Rockford, Ill., and Keickhefer Container Co., Milwaukee, Wis. All of these paper cases can be purchased in blank form and assembled in the brewery as wanted. In the instance of the solid fiber cases 15,000 blanks are stated to be stored in the space required for 1,000 wood cases and 1,200 filled cases in the storage space required for 1,000 filled wood cases. As for corrugated paper cases, 7,000 knocked down cases require only the same storage space as 1,000 wood cases. The ratio for filled cases is approximately the same as for the fiber cases.

By the use of colored stock all paper cases can be made as decorative as desired and by choice of inks and stock finish the printed message on them can be made pleasingly distinctive.

Although the wire-bound box has long been familiar to food manufacturers as a low-cost, pilfer-proof, light-weight, wooden shipping case, only recently has it been made convenient and easy to assemble and capable of being used more than once.

PREVIOUS to the introduction of the Bruce box by Package Research Laboratory, Rockaway, N. J., the wire bound box required extra labor to assemble it by shaping it in a form and nailing the ends in place, and it also required a specially designed tool to close it by twisting together the ends of the encircling wires.

The Bruce box is complete in knocked down form for stacking, can be quickly assembled as wanted, as indicated in accompanying illustration, by bending the looped wires to hold component parts together. No special tool is required either to close or open the cases. Such cases may be used many times if desired. They are now used for shipping citrus fruits and celery, but are equally applicable to shipping packaged foods when there is little exposure to weather conditions.



Recent improvements in the familiar light-weight wire-bound case have made it a quickly and easily assembled reuse shipping crate.

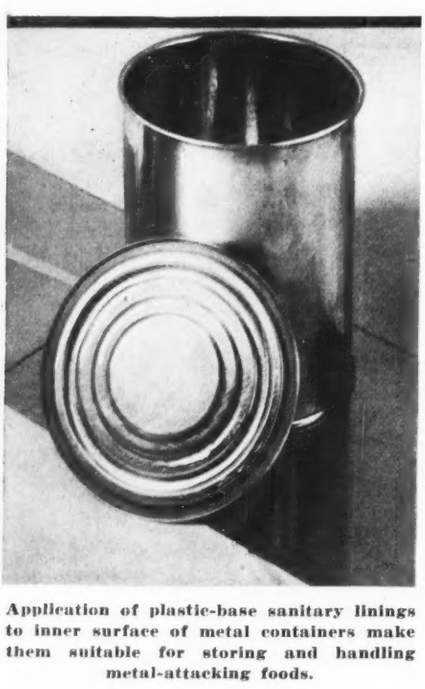
Plastics

As closures, containers, lacquers and adhesives, synthetic resins add to the decorative appearance of food packages and protect their contents.

AS THE ACTIVE principle in molded closures, molded containers, hot-water-resisting adhesives, liners or enamels for metal food containers and lacquers for labels and lithographed surfaces, synthetic resins have been slowly gaining recognition for food packaging.

Those of the phenol-formaldehyde group, such as Bakelite, Resinox, and Durez, find the widest use for molded closures. Plaskon of the urea-formaldehyde group is molded into general use containers and into small plaques for decorative seals on wine bottles. Resins from both of these groups comprise the protective constituent of liners or enamels for metal containers and together with Glyptal resins, for heat-and-water-resisting lacquers. Vinyl resin finds general use in hot-water-resisting adhesives for collapsible tube closures, paper milk bottles, and cork or pulp liners for glass container closures. It is also the binder in an adhesive for moisture-resisting transparent cellulose wrappings.

In the form of molded closures these plastics or resins do not find as wide use in the food field as in the drug and cosmetic industries. In fact, except for a few extract, sauce or condiment containers, molded closures are very largely limited to use on wine bottles and some of the important fabricators of molded closures think that such closures will continue to have a limited use on food



Application of plastic-base sanitary linings to inner surface of metal containers make them suitable for storing and handling metal-attacking foods.

Wine associations are adopting seals made from plastic materials as insignia of guaranteed quality of their wines.

Manufacturers of extracts, condiments and sauces have shown much interest in heightening the appearance of their packages by the use of plastic closures.

Closures molded from synthesized resins give an attractive and finished appearance to wine bottles.

An exceptionally attractive package results when a molded jar is used as a container for food specialties.

containers because of the inability to get a vacuum or an air tight seal with them. They are made in a variety of designs and colors, have diameters ranging from $\frac{1}{4}$ to 5 in., and can have permanent trade mark and decorative designs molded into them, yet their chief value is to add to the appearance of the container.

IN the use of molded containers for de luxe packages for foods the California Prune and Apricot Growers Association has pioneered with a Plaskon jar for its product, prune whip. The container is closed with a Goldy seal and when emptied finds reuse as a bathroom tumbler.

The widest use of these synthesized resins in connection with food packaging appears to be an ingredient in the "C" enamels used as liners of metal containers such as packers tin cans and steel barrels, drums, and pails or buckets. Because of the protective qualities of these resin-base enamels the packing of acid fruits, of salmon and other fish, and of foods subject to discoloration upon contact with steel plate or exposed soldered seams has been highly satisfactory and has advanced markedly in the past five years.

Events of the past summer have been responsible for wider use of these resins in connection with food packaging. When the drought cattle, purchased by Federal Emergency Relief Administration, were distributed to the various packing plants for canning, the government required that the cans be so marked that the identifying information could not be easily removed. The usual method followed by meat canners is to purchase plain cans which, after filling and sealing, are retorted for approximately 110 minutes at 250 deg. F. in live steam. While still hot, the cans are generally washed in an alkali bath to remove grease. When dry, a fast-setting ordinary lacquer or thin varnish is applied to the cans, before a paper label is automatically pasted around the can, to prevent rusting in storage. In some instances the label is put on without any protective coating.

The government required that every can of F.E.R.A. meat had to bear a printed statement of identification and a warning to anyone who might be tempted to dispose of this canned meat illegally. The usual method of labeling was not satisfactory because the label could be easily removed. By coating the lithographed cans with a varnish containing synthetic resin they withstood the live steam processing and the storage period without discoloration or rusting. This accomplishment is particularly significant because these results were obtained at no greater cost.

RESINS of both the phenol-formaldehyde and the urea-formaldehyde types have come in for use in the more commonly used label lacquer or varnish.

Manufacturers of the phenol-formaldehyde resins are Bakelite Corporation, New York, N. Y., Resinox Corporation, New York, N. Y. and General Plastics, Inc., North Tonawanda, N. Y. Urea-formaldehyde resins used in food packaging are manufactured by Toledo Synthetic Products Co., Toledo, Ohio, and Stokes & Smith Co., Philadelphia, Pa.; Vinyl resin by Carbide and Carbon Chemical Corp., New York, N. Y.; Glyptal resin by General Electric Co., Schenectady, N. Y.

Adhesives

Utilization of new wrapping materials and speed-up of operations possible through developments that meet specific requirements

KEEPING case-history records of the sealing problems they have solved is one of the most helpful contributions by adhesive manufacturers to better packaging of foods.

Even though the materials entering into adhesive manufacture are relatively few the proportion of each ingredient and the adhesive characteristics obtained by variations in processing are so many that a careful balancing of all factors is essential to get the desired "tackiness," surface penetration, and time of drying or setting.

Basically, sealing is a matter of getting surfaces to adhere to each other. Adhesives play their part by serving as a binder. They have no particular strength in themselves but when spread thinly between two surfaces which are penetrated by the adhesive, or to which the adhesive will attach itself, they form an attachment between the surfaces called sealing. If the adhesive is too heavily applied the result will be very little better than if too little adhesive be used.

For use with most foods the adhesives must be odorless, capable of being applied cold, and, in connection with transparent wrappings, they should be colorless at least to the extent of forming a colorless film when spread between the surfaces to be sealed.

In connection with food manufacture adhesives are used to: 1. Glue folded boxes; 2. Label bars, bottles, cans, and cartons; 3. Seal collapsible tube closures; 4. Seal fiber and corrugated paper cases; 5. Tight-wrap cartons with printed labels; 6. Wrap products with transparent celluloses and seal the packages; 7. Wrap individual boxes or cartons after they have been filled.

Some of these uses require slightly different adhesives; others require greatly different ones.

Some food manufacturers are further interested in the performance of adhesives because they are manufacturers of setup paper boxes, paper boxes with windows of transparent cellulose, paper cans and tubes, paper milk bottles, and waxed paper, glassine or transparent cellulose bags in which to package their products.

In the main, adhesives are made from corn, tapioca, and arrowroot starches by controlled chemical gelatinization of the starches. Quite recently sweet potato starch has come into prominence as an adhesive ingredient.

ALTHOUGH these adhesives are usually supplied to use as liquid glues or gums, or as pastes, there are manufacturers who supply them only in ready-mixed dry form to be put into liquid or paste form with hot or cold water just prior to use. Among the most notable advances made in adhesive manufacture are the adhesives used in the manufacture of paper milk bottles and for closing collapsible tubes. They are water-insoluble cements not even affected by boiling hot water.

In the case of waxed papers, glassine, and some types of moisture-resisting transparent celluloses the wax or the coating on the sheet acts as an adhesive upon the application of heat.

Other types of moisture and grease-resisting transparent celluloses require odorless organic solvents such as "Methyl Cellosolve," to make them "self-sealing" and suitable for use on automatic wrapping machines. In such cases sealing is accomplished because the solvents soften and make "tacky" the transparent coatings on the sheets and then volatilize to leave the softened surfaces adhering to each other as a seal with the application of heat and pressure. The strength of these seals is dependent upon the thickness and nature of the moisture-resisting coating. In addition to these solvents there are specially prepared gums, such as: "Cellulose Adhesive" of Williamson Glue & Gum Works, "Cellu-Gum" of National Adhesives Corp., and "Vinylseal" of Union Carbide and Carbon Chemicals Corp., for use with these transparent wrappings. These gums are slow-drying and as there are two different types of transparent wrappings, viscose and acetate, gums are also of two types.

In view of all factors involved one must bear in mind there is no all-purpose adhesive. The best adhesive for a sealing operation is the one which embodies the greatest number of favorable qualities and the fewest objectionable or neutral ones. In general these qualities for food manufacturers are:

1. Attraction to and penetration of the surfaces to be glued.
2. Freedom from odor and discoloration of wrapper or label.
3. Non-foaming during passage through pump on wrapping machine.
4. Proper viscosity and, sometimes, flexibility.
5. Tackiness.
6. Time of setting.
7. Waterproof qualities which have influence upon permanency of seal.
8. Transparency, especially for use with transparent wrappings.

SELECTION of the correct adhesive to seal any package satisfactorily involves not only knowledge of the adhesives available and their qualities but also of the surfaces to be sealed, the means of applying the adhesive, and the time interval in which sealing must be done.

Because of the demands upon adhesives during the past five years, a compilation of experiences in solving sealing problems constitutes a valuable reservoir of information upon which to draw when a new packaging problem has to be faced. Adhesive manufacturers who have such a reservoir of accumulated knowledge include: National Adhesives Corp., New York, N. Y.; Stein, Hall & Co., Inc., New York, N. Y.; Union Paste Co., Medford, Mass.; and Williamson Glue & Gum Works, Inc., Chicago., Ill.

FOOD PACKAGES and PRODUCTS

Hart & Howell Co. puts pop corn in glass.

Above: Multiple-purpose carton of Cleveland Beverages, Inc.

Right: Candy box with hinged cover, by E. Greenfield's Sons.

New

Well-Dressed Beer. Class in the packages of Hoffman Beverage Co., Newark, N. J., is not limited to the Club Soda bottle which won the Wolf award. This company also has created unusually attractive designs for its beer, ale and bock-beer bottles. Styled after the Club Soda bottle, these packages culminate from three years of development and represent an engineering achievement as well as a work of art.

The beer, ale and bock-beer bottles are distinguished by their neck-

and-closure ensemble. Over the crown cap closure is a sanitary cap of heavy paper which folds down over the upper part of the neck, the fold-over strips being stapled by a special machine. Around the neck of the bottle is crumpled metal foil, and covering the top and bottom edges of this are paper labels which completely encircle the neck. The body label goes half way around the bottle and is placed low on the body to balance the neck ensemble. Between the body and lower neck labels is seen the dark color of the bottle, an effective contrast with the light labels, neck foil and outer cap.

A Glass of Pop Corn. Pop corn is a new addition to the prolific family of foods packaged in thin glass tumblers. Hart & Howell Co., Brooklyn, Mich., has adopted the Safedge tumbler with a "hermetically" sealed metal closure for its Sure Pop corn. This container effectively displays its golden contents, and it has the technical attribute of preventing the corn from losing the moisture needed to explode it.

Four-Square Candy Kit. Something different in candy packages has been introduced by E. Greenfield's Sons, Inc., New York. It is a box covered with transparent cellulose and having hinged outer covers which afford convenient access to the contents. Of square shape, the box has a modernistic cover design, all of which suggests the brand name, Four Square. The color scheme gives a clean-cut, quality effect essential in a package for extra-quality candy.

Triple-Threat Beverage Box. Consumer convenience and display value are present in copious quantities in the carton used by Cleveland Beverages, Inc. This package comprises a waxed cardboard tray with a wooden handle attached and a cover of cardboard which slips over the tray and its contents. An opening in this cover permits the handle of the tray to project, providing a convenient means of carrying the carton home. The tray accommodates six bottles and makes an effective display unit in the store. In the home, it may be used to carry two bottles and four glasses for serving. The cover, too, has reuse value, making a convenient waste basket. This "Tray-Pak" container comes in knocked down form.

1. Keep-Fresh Marshmallows. Believing that a successful package can be improved upon, Angelus Campfire Co., Chicago, has revamped its "economy package" for marshmallows. Each of the four packettes making up the package comprises an open-top cardboard box containing sixteen marshmallows packed in two layers with two rows of four in each layer. This box is wrapped with sealed waxed paper lithographed in a striking red, white and blue color scheme of modern motif. The four individual packages are covered with a translucent, heavily waxed, sealed wrapper, and over this is a sealed, lithographed waxed cover.

2. Tapered Bottle for Sauce. There appears to be no limit to the number of attractive, yet distinctive, food containers that can be created from glass. Among the recent additions to this line is the bottle for the Derby barbecue sauce of Glaser, Crandell Co., Chicago. Tapered in shape, the jar is adorned with heavy vertical ridges, has a small square label and is closed with a single-shell metal screw-cap.

3. Cans With Appetite Appeal. Food containers which hide their contents sometimes can be given as much appetite appeal as those which show the product. That this is true is exemplified in the cans of de luxe White Rose fruits distributed by Seeman Bros., Inc., New York. The labels for these cans do the trick. The upper two-thirds of the label is devoted to an attractive and appetizing illustration of the fruit, showing it in a glass dish, ready to eat. This is

printed on a light background which contrasts with a dark band on the bottom third of the label.

4. Better Package for Salt. When it rains, it pours even better than before, because Morton Salt Co., Chicago, has improved the package for its salt. The new container is a triple-thick, moisture-proof cylindrical box with a won't-tear-out pouring spout. The size of the box is such that it makes a convenient handful for the consumer when she picks it up to fill the salt shakers. The spout, which is of aluminum, is attached to the box with a strong aluminum hinge. As to artistic effect, the box is well done. It is distinguished by a yellow top and bottom and a blue-and-yellow label, the design of which is clean-cut and attractive.

5. Cake in Sewing Case. Food packages have been designed for many purposes as reuse containers, but it remained for Dolly Madison Cakes, Ltd., Los Angeles, to bring out a cake in a sewing case. Of tooled leather, this package was put out as a holiday special. It contains a fruit cake wrapped in glassine and tied with magenta ribbon, a color which identifies all Dolly Madison packages. This and other reuse containers are potent factors in the merchandising program of the company.

6. Three-Color Milk Bottle. Triple-color eye-appeal is embodied in the milk bottle of Sparks Dairy, Inc., Buffalo, N. Y., and the container is highly sanitary. The bottle is decorated with red lettering and a red trade-mark, done by the Pyroglaze method in which the bottles are annealed the second time after lettering. Supplementing this color is a red transparent cellulose hood over the mouth of the bottle and a blue tape encircling the neck to hold the hood in place. These colors make a striking combination with the white of the product. Moreover, the hood protects the pouring lip against bacteriological contamination and also makes the container tamperproof.

7. Big Cheese in Tins. Five-pound quantities of natural, whole-milk cheddar cheese are being distributed in tin cans by Great Atlantic & Pacific Tea Co., New York. The cheese is cured in the can, the container having a valve in the top which permits the escape of gases formed during the ripening process, at the same time preventing air from entering. In this method the cheese is wrapped in transparent cellulose before being sealed in the can, and afterwards it is kept in a cool place until it ages. The company makes good use of the large surface on the side of the can, printing cheese-dish recipes on it.

Lard Made Better Mixer. Research having disclosed that the difficulty of properly mixing lard with flour and sugar is a basic cause of failures in cake and pastry baking, Armour & Co., Chicago, has introduced "texturated" lard to overcome this. The lard is run through a machine which cuts each pound into an estimated 3,500,000 parts and reassembles it.

This produces a product which shows up under a microscope as a mass of evenly spaced dots. Ordinary lard appears as a mixture of large and small globules, uneven in shape and unevenly spaced. Tests have shown, Armour reports, that dry materials can be mixed with texturated lard in half the time required for mixing with ordinary lard.

Minestrone in Cans. In the midst of a price war between long established companies in the field, Emm-an-Cee Co., Chicago, brought out a quality Italian minestrone soup and obtained what it considered excellent distribution within two weeks. This new product contains 23 ingredients, among which are twelve vegetables, including peas, tomatoes, onions, celery, potatoes, beans and carrots. The vegetable content comprises about 50 per cent of the soup, and dilution by the consumer is permissible. To successfully launch its new product, the company used a three-fold program: (1) A "sight-taste" test to dealers. (2) A free premium to the consumer with the purchase of two cans. (3) A free merchandising deal for the dealer for display and advertising tie-up.

Tropical Condiment. Pickapeppa sauce, a new creation in condiments, is being distributed by Fred L. Myers & Son, Kingston, Jamaica. This sauce is made from a variety of tropical fruits and vegetables, such as mangoes and oranges, blended with muscatels, tomatoes, onions and peppers. To this is added seven different spices, and the mixture is matured in cane-juice vinegar. Intended for flavoring soup, fish, roast, cheese and salads, the sauce is said to bring out the flavor of the dish and not alter it.

Coffee in "Doughnut" Bag. Taking a cue from the practice of tea packers, American Grocery Co., Hoboken, N. J., has introduced coffee packed in individual bags. Shaped like a flattened doughnut, the packages are for use in percolators. Each contains enough coffee to brew from four to six cups.

Season-to-Suit Soup. "Heat control" soup of the "pepper-pot" variety is an innovation by Phillips Packing Co., Inc., Cambridge, Md. Appreciating the variation in consumer preference as to the amount of seasoning needed in a product like this, the company seasons the soup to a mild degree of "hotness," leaving the consumer to use his pepper shaker.

Danish-Type Cheese. Using methods employed in Denmark but found in few plants in America, Danen Cheese Co., Portland, Ore., has begun the manufacture of toffel cheese. The product, which has a rich nut-like flavor, is produced in loaves of 10 to 12 lb. A natural cheese, it contains a high percentage of butterfat, is not cooked and stays soft and smooth when aged.

Clever Baking-Powder Can. Baking powder containers, for many decades nondescript cans which merely carried the product to the consumer, are coming in for improvement. Among the developments along this line is the new Calumet can of General Foods Corp., New York. Not only does this can open and close with an easy quarter turn, but it has a heavy paper inner-seal which keeps the powder air-tight until the can is opened and prevents spilling when the lid is removed. And when part of the inner seal is cut away along a dotted line, the edge of the remaining paper provides a handy means of leveling off an accurate spoonful. In addition to the convenience features, the appearance of the can has been improved. The color scheme has been changed to an all-over red background with white lettering, lithographed directly on the can. The lid is in white.

Modernized Vinegar Bottle. A glass container that bespeaks quality, is attractive and yet embodies no production-damming frills is the jar used by Shenandoah Valley Apple Cider & Vinegar Co., Winchester, Va., for its vinegar. The bottle, which is tapered to give it a broad base, has pointed panels of ridges on either side of a tapered label, the ridges providing a non-slip grip. The label pictures a luscious apple, as does the cap. The closure is a "Caseal" cap. Owens-Illinois makes the container.

Improved package for Calumet baking powder. Right: Vinegar container of Shenandoah Valley Apple Cider & Vinegar Co.

Lea & Perrins' sauce is an outstanding example of a product using a package that has never been changed in design and is still a leader in its class.

PACKAGING ECONOMY

By FRANCIS CHILSON
Consulting Packaging Engineer, New York, N. Y.

HAS package design as a merchandising factor been over-rated? On the other hand, has its *full* economic significance been *under-rated?*

This observer is beginning to believe that the answer is "yes" to both questions. Most of us have heard of instances where new packages increased sales, multiplied is the proper word, by enormous percentages. If these statements were all true then the food industries are wasting a lot of money on advertising and advertising men, sales and merchandising men, displays and all the other paraphernalia of distribution. If package design is as great a merchandising factor as it is said to be, then one should dismiss one's whole merchandising department and hire a good artist. Obviously such a suggestion is fantastic. There is a limiting factor somewhere.

All of us have been more or less gullible in regard to this question, but beneath the emotional outbursts of even the most enthusiastic proponents of the development, certain insistent questions have been clamoring for an answer. One is: How much of the success of new packages is due to the package itself, and how much is due to an increased advertising and display appropriation? Another is: How much of the success of new packages has been due to innovations or improvements in the product? And, finally, what is the proportion of failures to successes?

In all my experience I have been able to find but few successful new packages which have been totally unsupported by advertising of any kind. I have noticed that behind the success stories of most outstanding packages there is evidence of substantially increased advertising appropriations and marketing effort.

There are, however, a number of instances where an innovation or an improved product came to market in a new package and received general acceptance in a very short time. In cases like these the merchandising man says, "That's what design does for you!" While the technician who developed the product says nothing.

IT IS because of failure to make careful distinction that the whole issue is confused. Paradox runs afoul of contradiction and both pile on enigmas. A beautiful package fails; an ugly one succeeds; and vice versa. An ugly old package is redesigned and promptly its sales go off—and vice versa. Meanwhile, a certain fact stands out prominently: old packages which have never been redesigned continue to be pace-makers for their particular fields in spite of hell and high water. Let me give you a shining example: Lea & Perrins' sauce. The appearance of this package has not been changed in generations, but this product still leads all others of its class. Would its steady sales growth be suddenly accelerated if it were re-designed with the best possible artistry? Frankly, I am inclined to doubt it. Although modernists might ridicule its design, the L&P package is certainly the most

distinctive of its class. Having seen it once, one never forgets it. And who hasn't seen it?

It is my firm conviction that credit for all sales successes should be apportioned to the product, to advertising, to merchandising, and finally to the package. The package is placed last, because I am pretty well convinced that it is less important than the other factors. This attitude, however, does not offer much concrete aid, because a well-designed package is a powerful stales-stimulant in many cases. The bewildered manufacturer rightly believes that there must be *something* in packaging or else it would never have held the interest of all industry for so many years. There must be certain underlying principles which will guide him in making a decision.

WHILE the matter is still too new for such principles to be self-evident, the experience of the majority permits certain inferences:

(a) That a new product introduced in a well-designed package is more likely to meet with immediate public favor than is the case with one in a slovenly package—*all other factors being equal.*

(b) That in *some* cases a well-designed package acts as a powerful sales stimulant for a fairly considerable period of time.

(c) That re-design of existing packages can effect great economies in the purchase of packaging materials, in warehousing and transportation costs.

(d) That re-design of existing packages can be made to effect substantial economies in production costs.

(e) That attractive, neat package design is entirely justified even if it has no economic benefits at all, and is nothing more than a manifestation of the manufacturer's pride in his own products.

That these inferences are sound is self-evident. But the manufacturer who contemplates changing a package or introducing a new one must have a still more specific guide. This is just where the confusion comes in, for it is generally assumed that the experience of the group applies with equal force to the individual, whereas it doesn't.

Because the sales of a condiment, with a re-designed package increased tremendously, is no assurance that the same experience will be enjoyed by a pea canner who follows exactly the same procedure. In making comparisons one must be careful to limit them to his own particular field. The packaging experience of the food industries in general is of less immediate importance to the manufacturer of condiments than is the packaging experience of other condiment makers. Their goods are sold for substantially the same purpose, in the same outlets, with (store classification being what it is) substantially the same opportunities for being seen by prospective buyers. Although all food manufacturers are, in a general sense, competing for the consumer's dollar, the condiment maker is not concerned with the tenuous competition offered by the pea canner and the pea canner doesn't worry about the competition offered by the cereal maker and neither worries about the competition offered by the baking powder manufacturer.

THIS elementary generalization is obvious, but being obvious is so very easy to forget when the conflicting claims for package design are discussed. The experience of the trade in general is useful; but the experience of direct competitors is a more reliable guide. The manufacturer of an established product can quickly determine whether he should change his package by asking three simple questions:

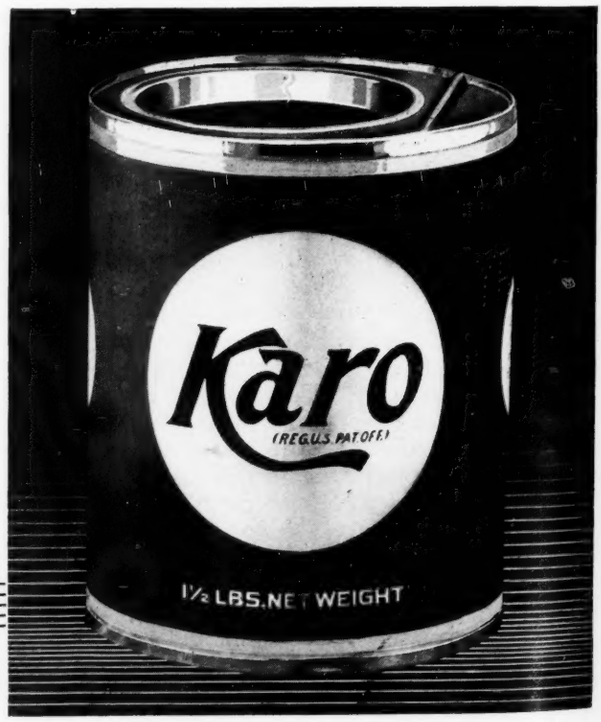
(a) Can my product be easily improved or duplicated?

(b) Are average sales of the item increasing satisfactorily in relation to the sales growth of that class of merchandise?

(c) Are profits on the item satisfactory?

These three questions are extremely important. If the product can be easily duplicated or improved the manufacturer had better watch competition. Even though a product may dominate its field, it can quickly lose its eminence in the face of a fierce competitive onslaught, especially if the new competitive product is better or cheaper and in a more appealing package. When products are not easily duplicated, the matter of competition from its own class is not so important.

One of the reasons why Lea & Perrins' sauce is still leader in its field, is that it cannot be easily duplicated. There are numerous imitations, of course, but, as the public says, "There's only one Lea & Perrins'." The sort of competition which most concerns an entrenched product of this kind is not that from imitators, but from different products which might be used for the same general purposes. A mustard or tomato sauce manufacturer may set out to convince the world that it is more desirable to use his product than Worcestershire sauce, in which case competition becomes a matter of concern for the latter. But, obviously, competition of this sort isn't the type which can be met simply by introducing a more



Karo syrup, a leader in its field, has continued to use the same package design, which because of its simplicity, is just as modern in appearance as most of the newer ones.

beautiful package. It requires stronger weapons.

The question of sales acceleration is a vital one. So long as the curve is climbing steadily; so long as it is climbing as fast or a bit faster than the average sales curve for products of that class; then the manufacturer need not worry particularly about his package. When the curve begins to level off and even to retreat in relation to the average curve for products of that class; then (assuming there has been no decrease in the percentage of advertising and merchandising appropriations) the package becomes a matter for keen scrutiny, because the package is undoubtedly a tool—and an important one—of merchandising.

The question of profits can never be left out of the reckoning. Very often sales may be increasing at a satisfactory rate, but profits are not increasing proportionately. Assuming that this condition is not caused by attempting to sell in uneconomic markets, but is caused by increases in material or distribution costs, then the package becomes a matter of keen interest, because a change in design may result in savings in packaging material cost and also in production cost as well.

It is this aspect of packaging which has been under-rated. That is why in the first paragraph we posed the question as to whether the full economic benefits of packaging have been fully evaluated. We feel sure they haven't.

INVARIABLY it is possible to reduce production costs by means of re-designing the package. Indeed, it is very difficult to find a package which could not be produced cheaper in one or more of the following ways:

(a) Simplification of materials—elimination of extra color runs, etc.

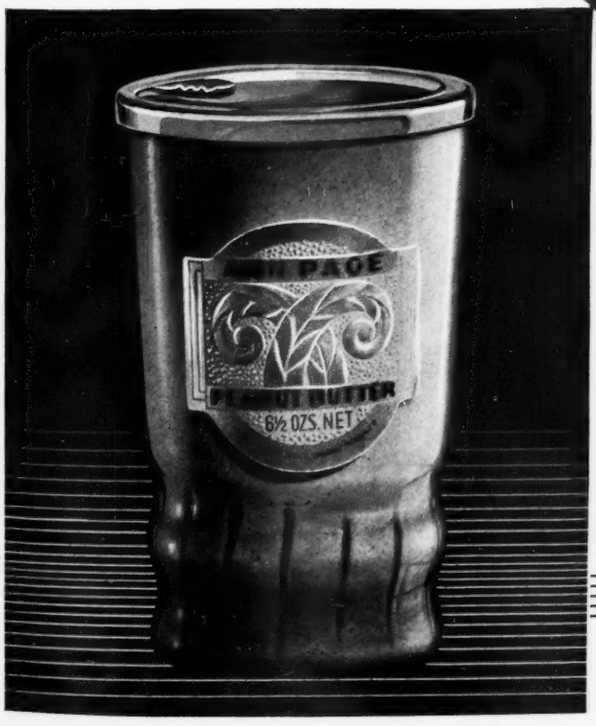
(b) Substitution of less expensive materials, *i.e.,* tin for glass, manilla stock for clay-coated stock, etc.

(c) Elimination of materials, *i.e.,* labels, cartons, wrappers, etc. (Such a procedure when possible and desirable saves not only the cost of the materials eliminated, but also the cost of the particular packaging operation.

(d) Modification of design to permit faster mechanical handling.

(e) Modification of shape to conserve storage space, save trucking and warehousing charges.

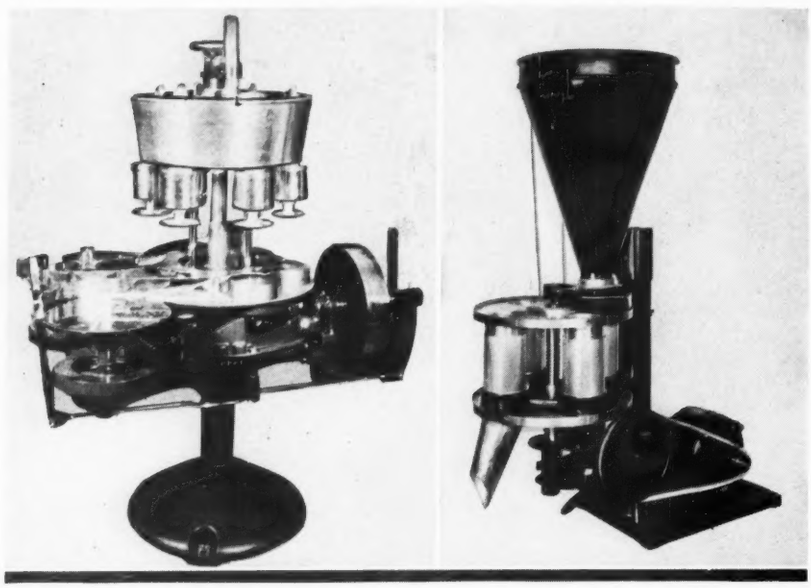
When one studies all the factors underlying successful packaging, it becomes evident that although the package is a valuable merchandising tool, it does not constitute the whole of merchandising technique, and, on the other hand, it is equally evident that packaging offers a field for economy which is still not fully exploited. The package can be in many cases a sales producer, especially for new products and new brands, and a cost reducer for both old and new brands.



The Ann Page family is packaged attractively, but its success depends more on the merchandising policy of A. & P.

PACKAGING

Equipment and Supplies



Adjustable liquid filler.

New dry filling machine.

Package Filling Machine

IMPROVEMENTS are announced by Frazier & Son, 7 Bremond St., Belleville, N. J., in their latest model of the Whiz-Packer filling machine. The most important of these is an increase in range, so that the machine is now adaptable for use with any size of package from the smallest up to a three pound container.

The machine is designed for use with such materials as coffee, tea, spices and seeds. As in previous models, the material is dumped from an overhead bin into the conical hopper. A dial, containing four telescoping cups, rotates intermittently, each cup being filled as it passes beneath the hopper. The filled cup is carried around to the front of the machine, where the contents passes down the spout and into the container which is held in position by the operator.

A multiple levelling arrangement incorporated in this filler gives the precision of a net weight machine combined with the high speed filling of a volumetric machine. Many of the popular items are now being packed at filling speeds up to 80 per minute. Speeds of 20, 40 and 60 per minute are also available. Products such as whole cloves and mixed pickling spices are filled at the same rate as the easier items and with the same accuracy.

To change the machine for different size packages or different products requires less than three minutes. All parts in contact with the product are rust proof and are easily removable for cleaning.

The agitation has been improved to provide a smoother flow of the product. A new design of interchangeable spout is used and can be furnished to suit the product or the container. In addition to the changes in the machine already discussed, the design has been improved to give greater strength and longer life.

Liquid Filler

A MACHINE employing a new type of valve, and which can be used either as a liquid measuring filler or as a filler employing the aerostatic cutoff principle, has been developed by Sprague-Sells Corp., Hoopeston, Ill. When the aerostatic cutoff is used, the can itself is the measuring device and when it is filled to a predetermined level, according to the adjustment of the valve, the flow of liquid stops. In this way all cans can be filled to the same level. When used as a measuring filler, the chambers just below the main tank are provided with adjustment plugs so that a very accurate adjustment can be obtained.

The advantages of this new style valve include the fact that no rubber seal pad and no spring is required, and the valve is very quickly and positively adjustable for either of the two types of filling. There are no displacement plates to control the filling level, and thus the rather slow job of adjusting such plates is avoided. The valves can be removed from the machine and disassembled quickly without the use of tools. Thus cleaning is comparatively easy.

This filler is designed for use with such products as tomato juice, citrus juices and clear soups. It is suitable for use with any free-flowing liquid.

Vegetable Casing

FOR casing meat products such as bologna, salami and other sausages, Pelocel Products Corporation, 444 Twelfth St., Brooklyn, N. Y., has brought out a vegetable casing with properties approximating those of natural gut. This casing is made from cellulose combined with a fibrous vegetable base. The product has high porosity, making it suitable for use where thorough smoking is needed. It has great strength and can stand as much pricking as is necessary to eliminate air pockets or water pockets formed during the filling. In addition it has sufficient elasticity to prevent bursting during the filling and cooking operations and the elasticity is uniform, thus preventing bulging. Pelocel casings are printed during manufacture and the printing cannot be erased or defaced in any way.

New Packaging Catalogs

NEW EQUIPMENT for the packing and accurate weighing of powders or granulars in packages up to 25 lb. is described by Stokes & Smith, 4905 Summerdale Ave., Philadelphia, Pa. This company also has issued a new bulletin describing the recently developed "Duplex" packer and weigher.

Pails, barrels, drums and other types of steel containers are listed, described and specified by Wilson & Bennett Mfg. Co., Chicago, Ill., in a new general catalog.

For placing adhesive on bread wrappers, a new valve called the "Argus" is described by Riegel Paper Corp., New York, N. Y., in two new bulletins.

The new model of the "Whiz-Packer" package filling machine is described by Frazier & Son, Belleville, N. J., in a recent bulletin.

A hand device for stitching and reinforcing cartons, the "Autoclench," is the subject of a folder issued by Autoclench Co., Inc., 270 Broadway, New York, N. Y.

PROMOTING *the Product* . . .

California Fruit Growers Exchange will use, to move this year's abundant orange harvest, 31,000,000 magazine and 14,000,000 newspaper advertisements, together with car cards and outdoor boards with a daily audience of 23,000,000. The association has distributed to dealers a colorful booklet announcing details and giving sample ads. Above is a car card as shown in the booklet.

▶ LIBBY, MCNEILL & LIBBY is using newspapers in about 40 cities in a spectacular campaign to promote "homogenized" baby foods.

▶ NATIONAL BISCUIT CO. plans to spend about $2,500,000 on advertising this year.

▶ ANHEUSER-BUSCH, INC., will increase its newspaper advertising budget by about $200,000 during the coming beer season, according to present plans.

▶ GENERAL FOODS CORP. will feature adventures of Dizzy Dean in a series of comic-strip advertisements. The company also is employing a $1,000 prize contest and premium offers to promote bran flakes, and it has renewed its contract to use Mickey Mouse and other Walt Disney characters.

▶ UNITED STATES BREWERS ASSOCIATION is establishing a Department of Public Relations to handle the first nationally organized advertising and merchandising campaign of its industry.

▶ ARMOUR & CO. will spend more than a million dollars this year and will use magazines, newspapers and publications in the food field, as well as radio.

▶ GOTTFRIED BAKING CO., New York, believes that motion pictures offer frequent tie-up possibilities to advertising-wise bakers. Posters on its trucks recently carried the message that David Copperfield "had no such nutritious sustenance" as Golden Crust bread.

▶ TELLING BELLE VERNON CO., Cleveland, has substantially increased its sales of cottage cheese, buttermilk, butter and ice cream by advertising these on its milk bottles. The ads, done in color on the bottles by the A.C.L. process, are read by the housewife when she is preparing the meal and is susceptible to menu suggestions.

▶ COLUMBIA BROADCASTING SYSTEM, INC., tells why radio advertising gets results in a clever booklet, "You do what you are told." This is a subtle and convincing tale of the authoritative quality of the spoken word.

▶ A recent survey shows the number of radio families to be 21,450,000, or about 2,450,000 more than indicated by the U.S. Census of 1930.

▶ GLASER, CRANDELL CO., Chicago, is using a Mickey-Mouse label on its glass jars for jam, together with a closure with a pushout slot which converts the package into a coin bank. To make the coin-bank appeal continuous, the company allows children a penny for every two caps returned.

▶ AUSTIN, NICHOLS & CO., Brooklyn, N. Y., has been offering consumers a set of nine labels which may be pasted on its coffee jars to convert them to kitchen canisters.

▶ GROCERS' ALLIANCE OF AMERICA, Chicago, has launched a nation-wide retailer contest on the sale of prunes, raisins and prune juice with travel tickets and cash prizes as awards.

▶ NATIONAL BISCUIT CO., in a tie-up with Western Union, has distributed 15,000 window posters showing the facsimilies on its premiere "Let's Dance" three-hour radio program.

▶ W. R. ROACH & CO., Grand Rapids, Mich., has issued a folder containing 42 recipes for using apple sauce. Interspersed with the recipes are statements glorifying canned products.

▶ RADIO doesn't replace other advertising but furnishes a proper eye-ear combination, members of Advertising Club of Cincinnati were told recently by Edgar Kobak, chairman of the board of A.F.A. and vice-president of N.B.C.

▶ BRAZIL NUT ADVERTISING FUND will continue on a more extensive scale the advertising program which last year moved the entire tonnage imported, together with a sizeable surplus from 1933. The campaign is financed by a levy on importations.

▶ PHILLIPS PACKING CO., INC., Cambridge, Md., now is distributing a line of 40 canned foods in 46 states. Sales have increased tremendously.

▶ INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS is issuing periodically to members a bulletin called the "Spinning Wheel" which carries ideas on merchandising.

▶ WISCONSIN ALUMNI RESEARCH FOUNDATION is directing a nation-wide movement to prevent rickets through the feeding of irradiated milk.

▶ HURON MILLING CO., New York, is using direct mail, store sampling and a sales guarantee to dealers to build sales for a new Swedish type crispbread which is "starch reduced for weight control."

▶ FISH & SEA FOOD INSTITUTE is maintaining a steady flow of publicity in the nature of recipes and facts about the nutritious quality of fish.

▶ KREUGER BREWING CO., Newark, N. J., reports a good response to its test campaign on "keglined" canned beer in Richmond, Va., and is expected to extend distribution throughout its sales area.

▶ WELCH GRAPE JUICE CO., Westfield, N. Y., soon will launch a newspaper campaign in a dozen large cities. Half-page ads, published once, will feature a message "Don't be overweight."

Quality Depends on Temperature

Milk, butter, cheese and eggs must be stored and handled at controlled temperature to prevent deterioration.

By HARRY STINER
Los Angeles, Calif.

CONTINUING the discussion of methods of shipping, storing and protecting the raw materials of food manufacture, I will deal this month with dairy products and eggs. In FOOD INDUSTRIES for January, February and March, 1935, cereal products, nuts, sugar, spices, meats, vegetables, shortenings and chocolate have been discussed. This series will be concluded in FOOD INDUSTRIES for May, with a consideration of a number of miscellaneous products, such as colors, flavors and leavens.

Milk

CONTAINERS

Fresh milk, cream and buttermilk are normally received by the food manufacturing plant in metal milk cans.

Evaporated milks are packed in tin cans, which, in turn, are packed in wooden or fiberboard cases.

Malted milk, powdered milk and powdered cream are shipped in paper-lined, slack-coopered barrels.

SHIPPING

Dry and evaporated milks should be shipped in clean, dry vehicles at normal temperatures. Shipment and delivery of fresh milk, cream and buttermilk will be by the approved method peculiar to the furnishing company. Dry milks are particularly susceptible to spoilage from excessive moisture, therefore a thorough inspection of the contents of all soiled or damaged containers before storing is always advisable.

STORAGE

Fresh milk, cream and buttermilk easily absorb foreign odors and consequently should be stored apart from other materials. These commodities should always be held below 50 deg. F. At this temperature, good quality pasteurized material will keep safely for one week. For longer holding, or poorer quality, the temperature is often reduced to as low as 34 deg. F., in which case the milk will remain more or less unchanged for one month. Frozen milk products will keep indefinitely; but, as freezing always induces separation of the fats, it is not customarily practiced. Milk products freeze just below 32 deg. F.

Properly processed and sealed evaporated milk will keep indefinitely in normal storage. Doubtful materials that are intended for long holding may be kept at 34 to 36 deg. F.; but, as evaporated milk has a tendency to coagulate when frozen, a lower temperature should not be used.

Dry milk products, when tightly covered, may be safely held in a cool, dry place for short periods. The best practice is to place in dry cold storage all powdered cream that will not be consumed within one week, malted milk within two weeks, powdered whole or buttermilk within four weeks, and powdered skim milk within two months. When dried milks are removed from cold storage, they should always be used promptly.

PEST CONTROL

Bacteria develop in all liquid milk products unless frozen solid, or sterilized and sealed. Below 50 deg. F., rapid bacterial growth is checked; and it decreases as the temperature is lowered, but does not cease until the product is frozen solid. Pasteurization for 30 minutes at 140 deg. F. destroys 90 per cent of the bacteria in milk, but it requires a temperature of about 245 deg. F. for 15 minutes to effect complete sterilization. Also, while heat sterilization stops further bacterial development, it in no way reduces the bacteria-caused deterioration that has already occurred. Evaporated milks are sterilized during manufacture, but unless tightly sealed will be recontaminated.

Dry milks are not often molested by insects, because of their containers and normally short periods of storage. Rodents, however, attack all forms of dry milk, often gnawing holes in the containers of long-stored stocks.

Moisture is the principal enemy of stored dry milk, causing rancidity, mold, and eventual decay. Dried cream averages about 1 per cent moisture, other dried milks seldom more than 3 per cent. All absorb moisture avidly. As they are not sterilized during manufacture, mold growth starts immediately following moistening. Mold causes them to turn rancid and to become foul, musty masses unfit for food. Rancidity in these products is easily evident from its sour, pungent odor.

Temperatures below 50 deg. F. slow down the development of microorganisms, and also enzymic action, in dry milks. Cold rooms above 34

The standard, loose-cover container is shown in this shipment of frozen eggs.

deg. F., however, contain relatively high humidity, making them much less desirable for long holding than storage spaces at a still lower temperature.

Butter and Margarine

CONTAINERS

Paper-lined wooden boxes or sealed wooden tubs are the customary containers for butter, oleo and nut margarines.

SHIPPING

For short hauls, these products may be shipped at 40 to 45 deg. F. However, as these products are customarily stored at freezing temperatuers of 10 deg. F. or below, it is safer to hold them at the same level during transit.

STORAGE

Butter and margarine may be held safely for a few days at 32 deg. F. For longer periods of storage, freezing temperatures should always be used. It is not customary to store them at any temperature longer than 8 or 9 months. When held much longer they usually depreciate noticeably in quality.

Butter containers, especially for long holdings, should be filled completely full and should be air-tight and of opaque material. The combination of air and light damages butter flavor rapidly.

Unsalted butters will freeze just below 32 deg. F. Salt reduces the freezing point by an amount depending upon the quantity of salt in the butter. It is usual practice to hold butters at temperatures between -10 and 10 deg. F., depending on length of holding time. Butter and margarine should be held separately from other commodities, as both easily absorb foreign odors.

PEST CONTROL

Ordinary storage pests seldom molest butters. However, like all other moist dairy products, spoilage or decomposition caused by micro-organisms easily occurs. When solidly frozen and well sealed these products will keep indefinitely, as practically all counteracting activities are inhibited.

Results produced by bacterial activity, and methods of control, are in effect the same as for milks.

Cheese

CONTAINERS

For cottage cheese or cream cheese, milk cans are used as containers.

Whole or skim milk cheeses are packed in gauze-wrapped hoops, in wooden or fiberboard cases.

SHIPPING

All cheeses should be shipped in carefully-cleaned, refrigerated vehicles. When taken from cold storage, they should not be permitted to rise over 10 deg. F. during transit, and should be immediately used upon receipt, or else returned to their former temperature.

STORAGE

Cottage and cream cheese may be stored at 40 deg. F. for one week to ten days. For longer periods, they should be frozen solid, requiring a temperature depending upon salt content, although usual practice is to hold at from 0 to 10 deg. F.

Whole and skim milk cheeses may be safely held at 32 deg. F. for 15 months; but as ripening continues at this temperature, fully-ripened cheeses should be placed in a colder storage.

Fresh (green) cheese, held at 32 deg. F., ripens very slowly. Generally, for baking purposes, a rich (sharp) cheesy flavor is desired, which indicates a fully-ripened cheese, one that would easily decompose if ripening is not at once arrested. In general storage, cheese is not permitted to reach this stage. Final ripening is frequently done in special rooms, under specially controlled conditions, requiring careful attention to prevent over-ripening and the surface slime caused by bacterial action.

PEST CONTROL

Cottage and cream cheese must be protected from molds and bacteria in

(Turn to page 208)

Dairy Adopts

Fiber Milk Containers

Carries 2,500 quarts in a ton-and-a-half truck; dispenses with use of ice and heavy wooden cases

ON MARCH 11, Dairy Sealed, Inc., inaugurated the first exclusively fiber-packaged milk distribution business in the metropolitan New York area.

On that date 461 store outlets were converted overnight from the sale of milk in glass bottles to fiber packages. The entire output of its plant in Ozone Park is packaged in Sealcone containers. There are no bottles at this plant.

The entire set-up of Dairy Sealed, Inc., an independent, exclusive Borden subsidiary with R. H. Webb-Peploe as president, including its plant and the delivery equipment, which plays such an important part in the scheme of operations, was intentionally so arranged as to prevent any chance of improper proration of charges for bottles, bottle storage, bottle filling and washing, bottle breakage, bottle icing, or even the trucks required to deliver bottled milk, such as might occur were glass bottle and fiber package operations conducted under the same roof. Such a distinction is most important, since Dairy Sealed, Inc., expects that its exclusive fiber package milk plant operations and delivery trucks will result in an appreciable reduction in the delivery cost of fluid milk distribution.

At the time of writing, Dairy Sealed, Inc., is making delivery to A. & P. stores in Brooklyn and Queens. Ultimately deliveries will be made to store outlets in other boroughs of New York City proper from its plant at Ozone Park. This plant will be operated alone until the volume of business increases sufficiently to justify the establishment of a second pasteurizing and packaging plant in one of the other parts of New York.

A New York State law which prohibits the pasteurization and packaging of more than one grade of milk in any one plant is responsible for the fact that only Grade B milk and cream is packed or handled in this establishment.

There is no house-to-house delivery. Dairy Sealed milk is sold exclusively to the stores. The company does not now nor does it plan in the future to make any deliveries to retail customers. The initial contract for retail store outlets involves the exclusive sale of milk in fiber packages to the stores of that chain. Other similar contracts are now in the process of negotiation.

From the economic standpoint, the establishment of Dairy Sealed, Inc., business in fiber packages seeks to effect a considerable net saving in the distribution of fluid milk as compared with the cost of distribution in glass bottles.

ANTICIPATED savings in fiber packages compared with glass bottles will probably be the result of these exclusive chain store contracts, giving a maximum of volume in as small a delivery area as possible. Other advantages that are hoped for are: economies in the actual fiber packaging operations, reductions in the size and cost of the plant required for packaging, elimination of the expense and bother of deposits on bottles in retail stores, the elimination of the cost of ordinary crushed ice to keep the milk cold, reduction in the weight of the milk container itself, which in the case of glass usually weighs more than the milk which it contains. Furthermore, the new system of distribution involves a means whereby a group of a dozen containers are handled as a unit in a corrugated paper shipping container and has led to the development of a new type of delivery vehicle, especially designed to handle milk in fiber containers. The savings enumerated bear out the prediction made on Page 22 of FOOD INDUSTRIES for January, 1935, that as the packaging of fluid milk and cream, in fiber containers in place of glass bottles, gains greater public acceptance, greater economies in motor truck distribution costs can be looked for. At that time it was predicted that the substitution of the lighter fiber containers for the glass bottle, the lighter corrugated paper carton for oak or ash wooden cases for glass bottles, and the insulated body for ordinary cracked ice in cases would ultimately result in a lighter truck carrying a greater payload in proportion to its own weight. This would permit a lower unit cost of delivery.

A truck of this new type has been evolved in the newly adopted standardized delivery vehicle put into service by Dairy Sealed, Inc. The truck selected is a Ford V-8, 157-in. wheel base with oversize 750x20 balloon tires all around (single in front and dual in the rear) permitting a maximum payload capacity of 5,500 lb.

The new Dairy Sealed, Inc.'s, Ford, both sides of which are shown in the accompanying illustration, has a gross allowable weight of approximately 12,000 lb. Of this total, the chassis and cab weigh 4,300 lb.; the insulated body approximately 1,500 lb., or 5,800 lb. total for chassis, cab and body. This permits a total safe payload of 6,200 lb.

Sealcone paper containers are now used and when packed at the rate of

twelve to a corrugated carton, weigh about 28 lb. The truck body has a sufficient cubical capacity to carry a total of 200 such cases, which gives the truck the capacity of 2,400 qt. containers of milk per load. The weight of these 2,400 qt. of milk at 28.5 lb. per carton is 5,700 lb., or 500 lb. less than the maximum allowable payload of 6,200 lb., as stated in the preceding paragraph.

A COMPARISON of the foregoing figure with the weight of 2,400 qt. of milk in glass bottles carried in wooden cases and kept cool by cracked ice is very interesting. Twelve quarts of milk in glass bottles in a wooden case weigh approximately 64 lb. without ice, and 84 lb. with ice. A total of 2,400 qt. of milk so bottled and cased without ice weigh 12,800 lb., or more than the gross weight of the entire truck, cab, body and the same load when put up in fiber containers. This one comparison shows the great possibilities for reduced truck costs by reason of the use of the fiber container.

And if ice is used to keep the milk cool, when it is in glass bottles and wooden cases, the pendulum swings still further in favor of the fiber container and its corrugated paper carton. The same 2,400 qt. of milk weigh 16,800 lb., or 8.4 tons. It should be remembered that in the Dairy Sealed, Inc.'s, trucks, the same net load of 2,400 qt. in paper containers weighing 5,700 lb. is carried in a nominal 1½-ton truck, the safe carrying capacity of which has been increased by fitting oversize tires all around. Furthermore, the tires are not overloaded beyond the 10 per cent regarded as permissible under good commercial practice.

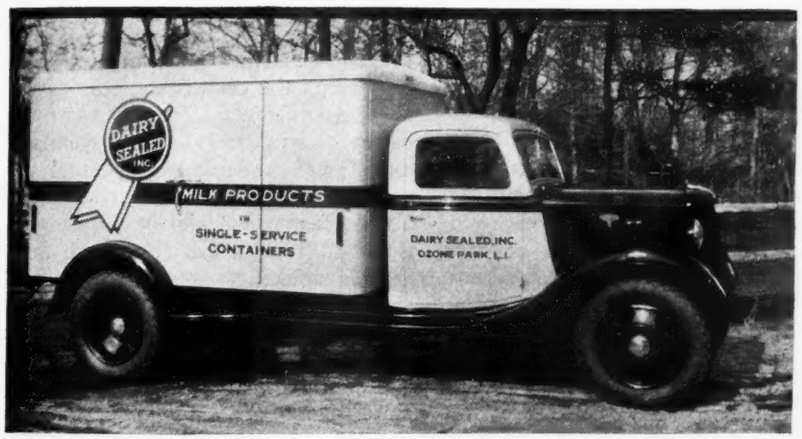
Furthermore, it would be impossible to carry 2,400 qt. of milk in glass bottles in wooden cases in the body mounted on the Dairy Sealed, Inc., truck because of chassis wheelbase limitations. The inside dimensions of the body are: 114 in. long, 65½ in. wide, and 57¼ in. high. Exclusive of the loss in cubical capacity, due to wheel housing over both rear axle dual tires, the body's gross capacity is 425,528 cu.in.

THE corrugated paper carton in which 12 qt. of milk in Sealcones is carried measures 14 in. long, 9 in. wide and 10 in. high and has a cubical content of 1,260 cu.in. The maximum carrying capacity of the body for cartons of this size would be 326 cartons of 12 qt. each. From this it is evident that the limitation of weight rather than cubical capacity is the controlling factor in this special Dairy Sealed, Inc., body.

Twelve quart wooden cases measuring 19 in. long by 14½x11½ in. high have a cubical capacity of 3,168 cu.in In a body having 411,514 cu.in. capacity, only 130 such cases could be carried. In other words, while the body in the Dairy Sealed, Inc., truck is well within the limits of both weight and cubical capacity for 200 cartons, or 2,400 qt. in fiber containers, it would be entirely inadequate for the same volume of milk if carried in glass bottles and wooden cases.

The specifications of the new Dairy Sealed, Inc., Ford chassis are similar to those for the Ford used by the Produce Division of Borden Sales Corp., which was described in greater detail on Pages 508 and 509, November, 1934, FOOD INDUSTRIES. There is an exception, however, in certain details of construction of the body that are slightly different. The Dairy Sealed, Inc., body is insulated but not refrigerated.

Cartons of milk loaded into the Dairy Sealed, Inc., truck body at a temperature of not more than 35 deg. F. are not expected to exhibit a rise in temperature of more than 5 deg. bringing them up to 40 deg. F. on the length of routes covered by this company. Note that in the accompanying illustrations, both side and rear doors are provided in the body for greater ease in unloading.



One of a fleet of 25 Ford V-8 trucks with insulated bodies just put into service by Dairy Sealed, Inc., in the first exclusive paper package milk business in the New York City area. Each truck has a capacity of 200 paper cartons of twelve one-quart packages of milk each, or 2,400 quarts in all. Note the full-height door on the right side of the body for facilitating sidewalk unloading.

The left side of the Dairy Sealed, Inc., truck showing the separate driver's cab; the proportions of the insulated body with its rear door and the lettering layout. The seal insignia shown on the body side is also used in much smaller size on the Sealcone paper packages in which the milk is put up. Deliveries of the milk are made to retail stores only.

Cell Filler

New Apparatus Aids in Obtaining Full Battery Service

OPERATORS of electric street trucks and electric industrial trucks in the food field will find the new cell filler described here an important adjunct in obtaining the maximum service from their vehicle batteries. This in brief is the opinion of one large food field truck operator, the George A. Krug Baking Co., Jamaica, Long Island, N. Y., which has had in service for the last six years a fleet of forty-five Walker electric trucks.

That company, according to Neil McEwen, its truck maintenance superintendent, attributes in a measure the satisfactory service and long life it has obtained from its batteries to the consistent use of good cell fillers of which the latest, automatic, type to be adopted is said to be even better than the earlier designs. The instrument is used to replace the water which evaporates from the battery cells during the charging periods and in subsequent vehicle operation.

The newest filler consists of a short length of pipe with a handle at one end and an indicating nozzle, set at right angles, at the other. In use, the handle end of the instrument is connected by means of a rubber tubing to a suitable source of battery water, such as the barrel mounted on a wooden stand supported on wheel casters shown in the accompanying illustration.

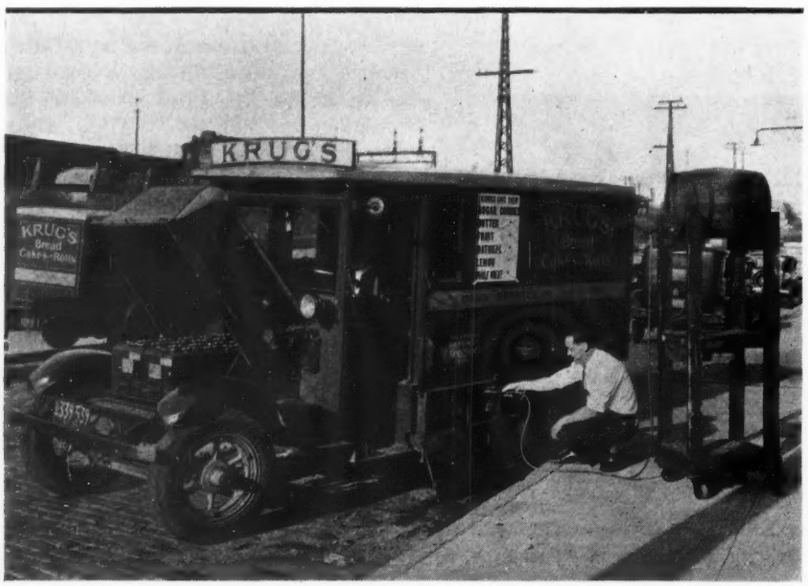
The water evaporated from the battery is replaced by inserting the other, or nozzle, end of the device successively in the filling vent of each cell. Merely inserting the nozzle into the vent permits the water to flow into the cell. When the battery plates are covered with water to the proper depth, an electric bulb on the handle lights up. This indicates that the filler should be withdrawn from that particular cell. Current for the bulb is secured by separate wires from the storage battery being flushed.

According to Mr. McEwen, this filler is superior to earlier types in that the power to operate the signal light is taken from the battery itself instead of from dry cells which have to be replaced. Also the sleeve on the nozzle which automatically stops the flow of water when the filler is lifted from one cell to the next is an improvement over the older models and makes it possible to do the work faster.

When the cells are always filled to the proper level by the systematic use of the filler, the operator is assured that the plates are always covered by the electrolyte. Because of this proper filling, there is no loss of the acid in the electrolyte, and in the Krug fleet no general gravity adjustment has been necessary over a period of six years.

Another advantage of always properly filling the cells is the elimination of acid spillage which eats away the battery trays and battery compartments and necessitates eventual repairs. Also when the batteries are always kept clean and dry, no objectionable grounds are developed.

This device can be used with any make of battery. Additional information concerning the filler or the apparatus itself may be secured from the manufacturer, Electric Storage Battery Co., Philadelphia, Pa., or from any of its branches throughout the United States.



Neil McEwen, motor vehicle superintendent of George A. Krug Baking Co., Jamaica, N. Y., demonstrates the automatic cell filler as an aid in obtaining the maximum service from electric truck batteries.

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New Battery Separators

THE Exide Mipor separators first introduced in Exide-Ironclad truck batteries late in 1934 are designed to increase battery life and reduce maintenance expense. They are made of an entirely new material which is sufficiently porous to permit the unrestricted diffusion of the electrolyte. Yet the pores are so minute as to prevent the penetration of even the smallest particles of active material.

The vulcanized rubber of which the Mipor separators are made resists acid to a high degree. Because the separators are vulcanized with heat during manufacture, they are immune to the heat developed in the operation of the battery. They also have the necessary mechanical strength to withstand the vibration developed in the street operation of electric trucks mounted on solid tires.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

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What is the best method of determining the cost of distribution by trucks?

Question No. 8

1. What kind of truck cost records can be justified?

2. Does it pay to keep individual truck cost records?

3. What is the clerical cost per truck per year for keeping individual truck cost records?

4. Are group costs less expensive and just as effective as individual truck cost records?

Favors Individual Costs

IN OUR opinion it does pay to keep individual truck cost records. Group costs are naturally less expensive, but in our opinion are practically worthless and especially so when a fleet of trucks is made up of four or five different kinds.

If only group costs were had, it would be impossible to tell which trucks were costing the most and which were costing the least to operate. We estimate that the clerical cost per truck per year for keeping individual truck cost records would be from $20 to $25. —E. C. FOGG, JR., *General Manager, Miami Home Milk Producers Association, Miami, Fla.*

Individual Costs Important

WE believe that individual truck cost records are just as important as individual expense account records for salesmen, and that it pays to keep such costs.

We do not have any large number of trucks at any one point. Taking care of this record is a matter of office routine and we have never attempted to estimate what it cost. To discontinue keeping these records would not save us any office expense.

Group costs may be all right for a large fleet, but we prefer to carry a record of each truck.—L. J. SCHUMAKER, *president, American Cone & Pretzel Co., Philadelphia, Pa.*

Swears by Individual Costs

IN the estimation of the man in charge of our truck transportation, records showing the cost per mile, and the cost per unit of load can be justified. He is also a staunch believer in individual truck cost records.

The cost of maintaining individual truck cost records averages from $5 to $10 per truck per year. He believes that group costs are less expensive but not as effective as individual truck records, as the information received from individual records is used as a criterion for future purchases of trucks.

Further, our experience has shown that the information we have concerning repairs and costs on individual trucks has enabled us to purchase trucks which have saved us money in operating expenses and also in the cost of repairs.—JOHN J. MULLIGAN, *Diamond Bottling Corp., Waterbury, Conn.*

Costs in Three Cities

YOUR questions on individual versus group truck cost records interest me and I am going to give you our experience in maintaining and operating a fleet of 85 trucks.

We maintain three garages in different cities, therefore have three different organizations and, I will say, three different types of experience. One manager gives a complete report on consumption of gas, oil and tires, also on repairs. Our system and forms are the same in two of our garages. The second manager does fairly well but is not nearly as accurate. He is accurate enough, however, to give us comparisons. In both these garages the forms are made out by one man.

The third garage has about 40 trucks and it is almost impossible to get a correct or regular report, although we have a very good man in charge. We have changed the system there now, making each truck driver responsible for his truck. This has proved more successful. In any case, these reports do justify themselves, because in spite of their inaccuracy, we get some very valuable information.

We do not keep group costs, except as to comparative costs of our three garages.—ROBERT FRIEND, *Friend Bros., Inc., Melrose, Mass.*

$12 per Truck per Year

THE types of records kept depend mainly on the number of trucks operated from any one point. I believe that the food business must be highly efficient in this department so as to give the public the delivery service which is comparable with its products. Owners operating less than ten units do not need an individual cost record, if the units operated are all of the same make. Also a mileage operation cost (gas, oil, tires, minor repairs) and unusual repairs, due to normal wear should be kept.

We have found several cases where a lower operating cost can be had by placing our equipment on various routes. The keeping of records will also eliminate the mishandling of trucks by drivers. The mishandling of trucks by drivers can be checked definitely through records of tire wear, gas consumption and usually the various types of repairs that are continually necessary due to sudden stopping, such as the racing of the motor when unwarranted.

I am thoroughly convinced that individual truck records pay extra dividends to their owners. For several years, we operated two or three types of gas trucks and only by individual records were we able to advise the pur-

Next Month's Question

QUESTION No. 9

When does it pay to retread pneumatic truck tires?

1. What are the determining factors which should be considered in retreading pneumatic truck tires?

2. What effect has the size of the tire upon the economy of retreading?

3. What effect have truck road speeds and percentage of tire overloads upon the determination to retread?

4. What is the relative merit of retreading the tread only as compared with carrying the retreading down both side walls of the tire to the beads?

5. Under what operating conditions are retreaded tires more likely to blow out than new tires?

6. What additional mileage, in percentage of new tire mileage, should a retreaded tire be expected to give under normal road speeds with the tire overloads not in excess of 10 per cent?

7. What method or process have you found to give the most satisfactory results for tire retreading?

chasing department of the type and model which was giving us the lowest cost per mile of operation.

The purchasing department is also advised through this analysis as to the most efficient accessories to buy, such as spark plugs, tires, speedometers, gas and oil. We have been able to keep our equipment more satisfactorily due to a minimum of breakdowns while trucks are on routes, by insisting on proper inspections at scheduled times. We have also been able to operate with one extra truck for every fifteen instead of eight or ten, thereby releasing several thousand dollars from the asset account.

We find the same analysis is indispensable in regard to our electric truck fleet. One great saving has been that the batteries in our electric trucks are not allowed to deteriorate to the point that trucks must be pulled in through the exhaustion of power while on the routes. Several years ago, this was quite a headache to our maintenance department.

The clerical cost per truck per year for keeping individual truck cost records is $12.

It is true that group costs are less expensive to maintain but they are not as effective, for it is impossible to know when a profitable replacement is necessary or how to lower your operating costs to a minimum. For example, with group records, we know that the average truck costs 8¼ cents per mile to operate but we do not know whether truck No. 124 costs 10¼ cents per mile to operate and truck No. 131 costs 6½ cents per mile, or why truck No. 131 costs 4 cents per mile less to operate.

If truck No. 131 costs only 6½ cents per mile to operate, there is some reason, and only by proper keeping of records can we ascertain the best method of lowering the cost of No. 124. I know definitely that in the past four years in which we have been keeping individual truck cost records, we have saved several thousand dollars though we know we are still far from the lowest point of operating efficiency.—WALTER C. BRICK, JR., *Parkway Baking Company, Philadelphia, Pa.*

Prefers Item Mileage Costs

WE have never tried to keep a detailed maintenance cost for each truck. Our trucks are all used in comparatively light work and we feel that there would not be enough variation in repair costs for a given make of truck, with the type of men we have operating them. Our chief concern in this connection has been to determine the cost of those parts which it has been our experience require replacement most often for the different makes of trucks we have considered when purchasing equipment.

The only items in connection with the cost of operation with which we have been concerned have been gasoline mileage, oil mileage, tire mileage, brake lining mileage, battery life and paint. We consider these the chief costs affected by either the operator or the product itself.

We believe that detailed cost records would be most valuable for a fleet consisting of a number of different-sized trucks. Under changing conditions, in a fleet of this type, it will be more easily possible to determine when it will be more economical to replace a certain truck with either a smaller or larger truck. A. F. WELLE, JR., *secretary, Colonial Baking Co., St. Louis, Mo.*

Individual Costs Imperative

TRUCK cost records are justified for they disclose the efficient equipment as against the inefficient. The inefficient can then be localized to:

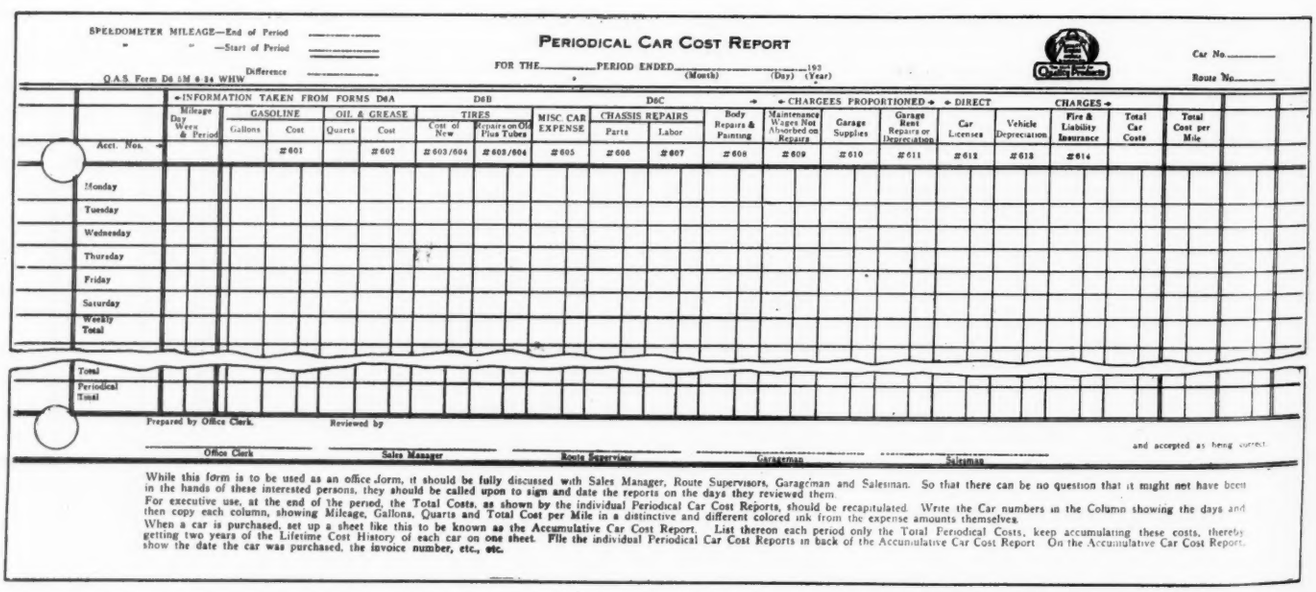
1. The incompetent operator.
2. The improperly maintained truck.

It definitely pays to keep individual truck records. The clerical cost per truck decreases in proportion as the size of the fleet increases. The individual cost can best be determined by considering the records which must be compiled. These consist of:

1. A Garageman's Service Report which shows trucks "gassed," serviced with oil and grease, etc.
2. The Salesman's Daily Truck Report indicating on the front the attention the truck requires and on the back, the parts that were supplied and the work that was done.
3. The Individual Periodical Car Cost Report which lists the cost of the gas and oil used, tires, repairs, maintenance, insurance, licenses, depreciation, garaging and the mileage.
4. The above reports summarized for the fleet.
5. The above reports summarized by periods for each truck to get a life-time history.

Based on twenty trucks to a fleet, the entire time spent by the salesmen, garagemen and office on these records figures out to about 18 cents per truck per week, or $9.36 per year.

Keeping costs on a group basis may be less expense, but the entire expenditure is wasted in that the causes for any out-of-line costs are still unrevealed.—JOHN THIES, *manager accounting service, Quality Bakers of America, New York City.*



SPEEDOMETER MILEAGE—End of Period ——— Car No. ———
" " —Start of Period ———
Difference ———

PERIODICAL CAR COST REPORT

FOR THE ——— PERIOD ENDED ——— (Month) ——— (Day) ——— (Year) 193

Route No. ———

Q.A.S. Form D6 5M 6 34 WHW

	← INFORMATION TAKEN FROM FORMS D6A		D6B				D6C			← CHARGEES PROPORTIONED →		← DIRECT CHARGES →					
	Mileage Day Week & Period	GASOLINE Gallons	GASOLINE Cost	OIL & GREASE Quarts	OIL & GREASE Cost	TIRES Cost of New	TIRES Repairs on Old Plus Tubes	MISC. CAR EXPENSE	CHASSIS REPAIRS Parts	CHASSIS REPAIRS Labor	Body Repairs & Painting	Maintenance Wages Not Absorbed on Repairs	Garage Supplies	Garage Rent Repairs or Depreciation	Car Licenses	Vehicle Depreciation	Fire & Liability Insurance	Total Car Costs	Total Cost per Mile
Acct. Nos. →			#601		#602	#603/604	#603/604	#605	#606	#607	#608	#609	#610	#611	#612	#613	#614		
Monday																			
Tuesday																			
Wednesday																			
Thursday																			
Friday																			
Saturday																			
Weekly Total																			
Total																			
Periodical Total																			

Prepared by Office Clerk. Reviewed by

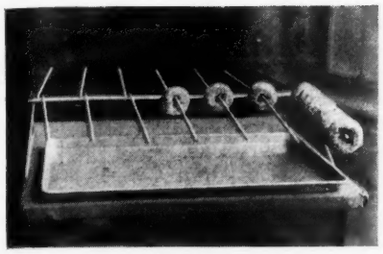
Office Clerk — Sales Manager — Route Supervisor — Garageman — Salesman — and accepted as being correct

While this form is to be used as an office form, it should be fully discussed with Sales Manager, Route Supervisors, Garageman and Salesman. So that there can be no question that it might not have been in the hands of these interested persons, they should be called upon to sign and date the reports on the days they reviewed them.
For executive use, at the end of the period, the Total Costs, as shown by the individual Periodical Car Cost Reports, should be recapitulated. Write the Car numbers in the Column showing the days and then copy each column, showing Mileage, Gallons, Quarts and Total Cost per Mile in a distinctive and different colored ink from the expense amounts themselves.
When a car is purchased, set up a sheet like this to be known as the Accumulative Car Cost Report. List thereon each period only the Total Periodical Costs, keep accumulating these costs, thereby getting two years of the Lifetime Cost History of each car on one sheet. File the individual Periodical Car Cost Reports in back of the Accumulative Car Cost Report. On the Accumulative Car Cost Report, show the date the car was purchased, the invoice number, etc., etc.

One of the three cost-keeping forms employed to develop individual truck costs by the Quality Bakers of America. The other two forms not shown herewith but described more fully in the accompanying text include a Salesman's Car Report and a Garageman's Service Report. On the form shown, note particularly the items of cost included and their arrangement to show total truck operating cost and cost per mile.

NEW EQUIPMENT

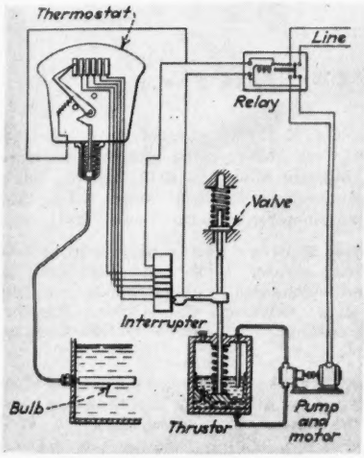
for Food Manufacturers



Doughnut drip rack.

Doughnut Drip Rack

FOR HOLDING doughnuts after glazing, a drip rack manufactured by H. A. Lezotte of Ogallala, Neb., is being marketed by T. F. Naughton Co., Omaha, Neb. As seen in the illustration, the rack is simply constructed of round and flat iron, with the bars for holding the doughnuts extending out to each side over a drip pan. When using this drip rack, the glaze is not spoiled on one side, as it is when the doughnuts are laid on a tray after glazing.



Temperature control system.

Temperature Control System

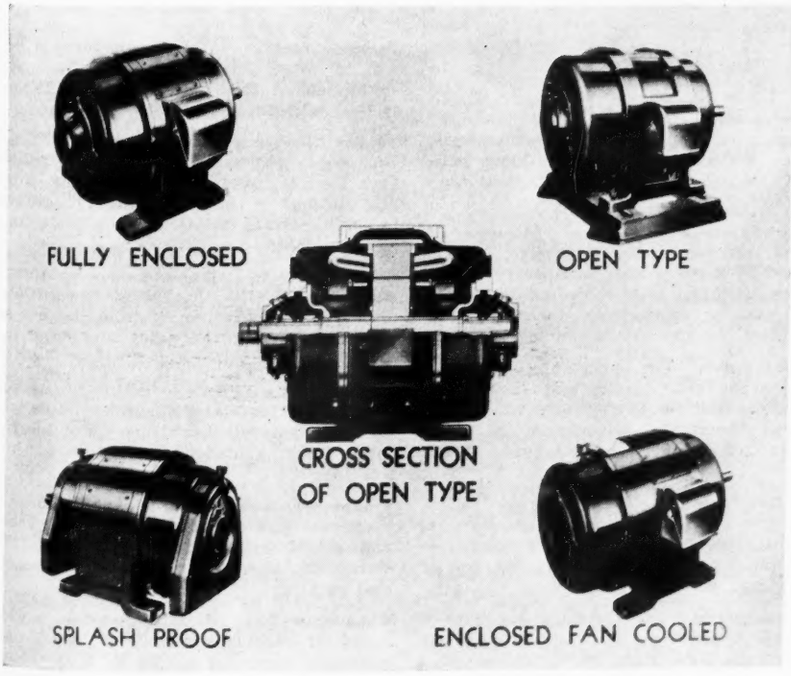
ELECTRO-HYDRAULIC action is used in a new temperature control system developed by Wilbin Instrument Corp., 40 East 34th St., New York, N. Y. It consists of an electric thermostat of the liquid expansion type, equipped with a commutator switch carrying six separate contacts. This thermostat operates a valve actuator, consisting of a piston moved up and down in a cylinder by oil pressure generated by a motor driven pump. The motor is started and stopped by the thermostat in such a way that the valve adjusts itself to a throttling position between open and closed just sufficiently to maintain the desired temperature. The range is from —50 to +950 deg. F. and the control can be used for steam, water, oil, gas or brine.

"Thermo-Drum" pasteurizer.

Pasteurizer

IN THE most recent design of "Lo-Vat" pasteurizer, Pfaudler Co., Rochester, N. Y., have embodied new features. Where heating, holding and cooling are to be done in the same vat, as in pasteurizing sweet cream, ripening cream, making buttermilk or starter, a flat-surfaced, rotating, heat exchanger called the "Thermo-Drum" replaces the usual type of agitator. This has a smooth surface which can be cleaned more readily than can helical or other heating coils.

When cooling, refrigerated sweet water is recommended for circulation in the "Thermo-Drum," though brine may be used. Hot water is used for heating. Inlet and outlet are located in the header at the top of the drive housing. Drive is fully enclosed, running in oil for quiet operation, and is leakproof, with no stuffing box inside the vat.



Convertible motor.

Convertible Motors

MOTORS that can be readily converted from open type to fan-cooled, splash-proof, or totally-enclosed type have recently been announced by Harnischfeger Corp., Milwaukee, Wis. These are squirrel cage and slip ring induction motors, and are made in all standard frequencies for service ranging from 110 to 220 volts. The range is from ½ hp., 600 r.p.m., to 125 hp., 3,600 r.p.m.

Conversion is accomplished by the design of the frame, endheads and bearings to permit interchangeability.

Thyratron Motor

AN ELECTRIC MOTOR that utilizes a "stationary commutator" and has the characteristics of a series-wound d.c. motor, but which operates from an a.c. power source, has been developed by E. F. W. Alexanderson, consulting engineer of the General Electric Co., Schenectady, N. Y. Known as the "Thyratron" motor, this development is made possible by recent advances in the application of electron tubes. With it, the motor speed is independent of the frequency of the power supply; smooth speed control can be obtained over the full range; and the efficiency is high and the efficiency curve relatively flat, a distinct advantage, particularly in the lower portion of the speed range. Also, in event of a momentary interruption of the supply circuit, the motor will, upon the restoration of power, start and return to the speed at which it was previously operating, without drawing excessive current from the line.

Because of these characteristics, motors of this type are applicable to driving such equipment as fans, centrifugal pumps, compressors and other machines having load characteristics such that the series type of motor can be used to advantage.

Rubber Tank Lining

FOR resisting corrosive action, a new rubber tank lining is announced by American Hard Rubber Co., 11 Mercer St., New York, N. Y. This lining, known as M-R-10 is characterized by a high glaze surface said to offer great resistance to acids and alkalis, and to be easily cleaned. The outer layer of glaze is bonded to a relatively thin layer of soft rubber which, in turn, is vulcanized to the metal tank. The soft rubber is elastic, compensating for expansion and contraction during heating and cooling, and also acting as a shock absorber to protect the lining against accident. Soft rubber fillets are used under the lining at corners.

Steam Trap

FOR DRAINING the high pressure coils and jackets of industrial heating and process equipment, Sarco Co., Inc., 183 Madison Ave., have brought out a new steam trap, No. 9-200. This trap is designed for use with any steam pressure, steady or fluctuating, from 0 to 200 lb. per sq.in. The operation is on the same principle employed by other Sarco traps, that of using a thermostatic bellows of helically corrugated metal tubing. The caps used for top and bottom of the bellows have threads of the same pitch and profile as the flexible tubing, and are screwed directly onto the bellows, make a strong and pressure-tight construction. A shield is also used to protect the element from the action of the steam over its entire length. These traps are available in capacities from 900 lb. of water per hour, at 200 lb. steam pressure and 20 deg. F. temperature drop, up to 3,300 lb. of water per hour at same pressure and 35 deg. F. temperature drop.

Brake Lining

FOR automotive service, a brake lining material has been developed by Wagner Electric Corp., St. Louis, Mo., which is called "Comax." It is claimed that this material is non-compressible under pressure, allowing brakes lined with it to run for long intervals without adjustment. It is said to be uniform throughout, with no variation in coefficient of friction from surface to surface. There is no abrasive in the lining, thus reducing wear on drums. Other claims are quiet, smooth action, and long life.

Motorized Speed Reducers

WITH motors attached directly to the housing of the reducing gears, a new line of speed reducers made by Link-Belt Co., Chicago, Ill., permits ready accessibility of gears and motors for inspection and maintenance. Oversize, anti-friction bearings are used and alignment is said to be assured. Helical gears are used. Lubrication is automatic. Advantages claimed are compactness and economy. These reducers may be mounted on floor, ceiling or wall; and are available in double reduction for ½ to 75 hp., in ratios up to 38½ to 1; and in triple reduction up to 30 hp., in ratios up to 292 to 1.

The Manufacturers Offer . . .

Switchgear—"Modern Money Saving" is the title of bulletin GEK-86, published by General Electric Co., Schenectady, N. Y., and dealing with switchgear.

Chain Drive—A new well-illustrated brochure showing applications of chains to industrial machinery for power transmission has been issued by Morse Chain Co., Ithaca, N. Y.

Synthetic Resins—Varnish, enamel, lacquer and cement of heat-hardenable types, made from Bakelite, are discussed in a new 40-page booklet issued by Bakelite Corp., 247 Park Ave., New York, N. Y.

Advertising Specialties—A 50-page catalog issued by Parisian Novelty Co., Chicago, Ill., deals with a selection of celluloid, metal, rubber and other advertising novelties made by this concern.

Portable Welder—Arc welders of the SAC 300 and SAC 500 types are described by Lincoln Electric Co., Cleveland, Ohio, in bulletin No. 308.

Optical Instruments—The small "Littrow" spectrograph, and polarizing microscopes, are the subjects of two new catalogs published by Bausch & Lomb Optical Co., Rochester, N. Y.

Control Instruments—Three catalogs of Taylor Instrument Co., Rochester, N. Y.: Catalog 56-R, "Fulscope" temperature controllers; catalog 68-J, recording thermometer; catalog announcing recorders and regulators for flow and liquid level.

Turbine Drives—For mechanical drive turbines, types D-58, D-60, and DS-60, are the subject of new bulletins published by General Electric Co., Schenectady, N. Y., as follows: GEA-1450 B; GEA-2044; GEA-2024.

Air Conditioning — For factories, buildings, stores, homes and other uses, a new illustrated catalog of Kelvinator Corp., Detroit, Mich., discusses the application of this company's equipment.

Refractometers—For refractometer control of food processing, Carl Zeiss, Inc., 485 Fifth Ave., New York, N. Y., issues catalogs of the following equipment: Refractometers for the food industry, bulletin Mess 455-11 E; dipping refractometers, bulletin Mess 165-e; hand sugar refractometers, bulletin Mess 455 d-11, U.S.A.; tomato refractometers, bulletin Mess 455-e; Abbe refractometers, bulletin Mess 172-11 (e).

Rubber Belting—For transmission and conveying, steam, water and air hose, and other mechanical rubber goods are listed by B. F. Goodrich Co., Akron, Ohio, in a new catalog which gives specifications and prices.

Hand Trucks—New series 9,000 hand trucks of types for all factory purposes, are shown by Fairbanks Co., New York, N. Y., in catalog No. 955.

Preheater—For mixing and preheating prepared food products, the Patterson "Pre-Heater" is described by Patterson Foundry & Machine Co., East Liverpool, Ohio, in a new bulletin.

Furnace Linings—Arches and furnace linings of "Steel Mixture" refractories, made by McLeod & Henry Co., Troy, N. T., described in Catalog No. 235.

Trailer Service—Booklet entitled "Good Business," published by Fruehauf Trailer Co., Detroit, Mich., describing the plant and business of this concern and its growth to an important position in the industrial haulage field.

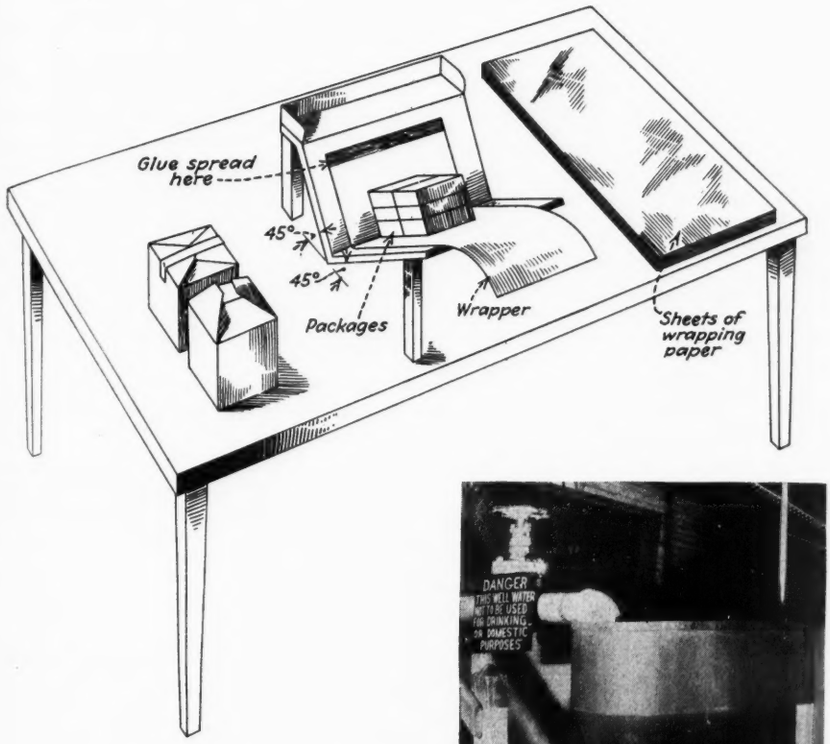
Stainless Steel—Pamphlet issued by American Rolling Mill Co., Middletown, Ohio, discusses five advantages from the use of stainless steel in the dairy and other industries.

Grinding Machine — Specifications for "Pennsylvania Junior" hammer mills are given by Pennsylvania Crusher Co., Liberty Trust Bldg., Philadelphia, Pa., in bulletin No. 1022.

Flavors—Essential oils, flavors, aromatic chemicals and similar products are listed and priced by Dodge & Olcott Co., 180 Varick St., New York, N. Y., in a new general catalog.

Chemicals—For industrial purposes, a wide range of chemicals are listed in the new quarterly price list of the R. & H. Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

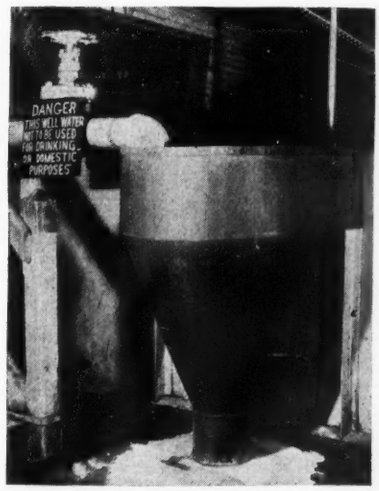
IDEAS
from Practical Men



Aid to Hand Wrapping

WHEN several packages are wrapped together by hand, production per man-hour can be increased by doing the cartoning on special V-shaped tables. These tables comprise an inclined "back-board" about two feet "deep" and three feet wide and a "bottom-board" joining the other board at right angles, the bottom-board being about a foot deep and three feet wide. The back-board is covered with sheet metal to form an easily-cleaned gluing surface, and a horizontal shelf at the top of the board may be provided to accommodate a paste pot and brushes.

This is how the table is used: The packager places a sheet of wrapping paper in the "V," stacks the packages on it, spreads glue along the top edge of the paper and folds the wrapper around the packages. He lets the carton remain on the stand a moment while the glue "sets," in that time sealing the ends of a carton previously wrapped and placed on the table beside him. No time is lost in this operation, and the operator can average 150 cartons an hour.



Handling With Water

THE removal of spent hops in a brewery can easily be handled by water delivering either directly to the sewer or to a dump tank. This is one way to handle the waste material of a food industry, the disposal of which is not always easy, unless it can be utilized as a byproduct.

While wet grains from a brewery have a market as cattle feed, the disposal of the spent hops is another matter, as no use has been discovered for the material. Formerly, one brewery dumped this material in its boiler room and later burned it under the boilers, a practice deleterious to the boiler settings and to the steaming abilities of the boilers. Getting the spent hops to the boiler room also presented a problem. The use of a conveyor was considered, but it was not believed to be the proper solution.

Waste water discharged from the ammonia condensers to the sewer was available so it was utilized. A cone-shaped funnel was built alongside the hop jack, as shown in the illustration. When the water struck the sides of the cone it was given a decided whirling action, which effectively moves the hops, no matter how rapidly they are dumped into the cone. An 8-in. pipe carries the spent hops to a tank in the yard. The entrained water is led to the sewer and the spent hops dumped into a truck for removal from the yard. Where it is permitted, the hops and water can be carried directly to the sewer and thus disposed without further handling.—EUSTACE C. SOARES, *New York, N. Y.*

For Sure Footing

IN many food manufacturing plants, flat steel plates used for truckways, door sills and loading dock toeboards become worn under traffic and offer a hazard through slippage when subjected to oily, greasy, wet or other adverse conditions. Scrap material which would otherwise be junked is often employed in this service. These surfaces can easily be roughened by the oxy-acetylene blowpipe flame.

In application, the flame is held on one spot until the metal just begins to liquefy. The flame is then quickly withdrawn and the application repeated on as many spots as are desired to secure the necessary surface roughness. The small indentations with the hard, rough edges of these artificial pit marks provide a long wearing surface of just the right texture to prevent slipping, even when pushing a heavily loaded truck. In typical cases the pit marks are spaced about 1 in. apart in each direction, either in straight or alternate rows.

Besides being able in this way to create a roughened surface in a few moments at short notice without material expense, a plate can be treated in place, and any degree of roughness desired can be applied.—H. S. KNOWLTON, *Boston, Mass.*

BUSINESS TRENDS

Butter Situation Eases

WHILE the amount of butter in storage at 7,981,000 lb. in mid-March, or only one-fourth of the five-year average, shows no relative increase, butter make has increased with the season. Parallel to this increase, prices in the Chicago market have fallen about 7 cents per lb. from the February level and the spread no longer gives imported butter an advantage over the domestic, when the 14 cents tariff is included. In spite of this, importations continued to arrive throughout March.

One interesting trend in the butter market is the apparently decreasing consumption, accompanied by a continued margarine production at levels 100 per cent above 1934. Some butter traders feel that a considerable reduction in price must be had before consumption turns upward again.

Canned Foods Stocks Lower

SEVEN principal canned foods showed lower stocks in the hands of canners, according to a recent report of the Foodstuffs Division, Bureau of Foreign and Domestic Commerce, issued in February, as of Jan. 1, 1935. Canned peas at 2,087,832 cases, all sizes, was 28 per cent below the preceding year. Corn, at 2,460,852 cases, all sizes, was off 51 per cent. Tomatoes showed practically no change, with 3,089,347 cases, all sizes, in stock. Green and wax beans, were off 8 per cent for the year, to 1,921,809 cases, all sizes.

Among the fruits, pears recorded the only advance among all the major products, increasing 48 per cent to 2,395,476 cases, all sizes, while peaches fell 24 per cent to 3,281,219 cases, all sizes, and pineapple dropped 17 per cent to 2,538,018 cases, all sizes.

Hogs Ascend, Meet Resistance

JUST BEFORE the middle of March, hogs in Chicago reached a top of $9.90, the highest since 1930. However, this level could not be held. In spite of light receipts, the price started sharply down again.

The reason for these gyrations lies in the fact that pork prices did not increase sufficiently to sustain the rise. Fresh pork is at levels that have proved distinctly discouraging to the consumer and the meat has consequently moved but slowly in retail channels.

Another factor in the situation is the fact that packers have withdrawn cold storage holdings liberally in order to modify competition for the relatively few hogs that come to market.

Purchase of hogs in the Chicago market this year up to mid-March was around 450,000 compared with 850,000 last year. Although this figure is not much above half that of the preceding year, it still seems too large for the demand at current prices.

Fats and Oils Shortage

AS MORE information becomes available as to the stocks of fats and oils on hand and the prospects for 1935 production, the extent of the existing shortage becomes more apparent. Lard in storage the first of last month amounted to 112,711,000 lb. compared to 168,756,000 lb. a year ago, a drop of 33 per cent. Butter, at 18,984,000 lb. was only 25 per cent of the stock the year before. Vegetable oil stocks, the first of the year, were 877,725,715 barrels, down 27 per cent from the preceding January.

Production in 1935 is not likely to show much, if any, increase and may be lower. Short hog supplies are likely to keep lard low, and butter should also be scarce because of curtailed herds. Cottonseed oil production will depend entirely upon the size of the cotton crop, which cannot yet be forecast. Already, the cottonseed oil production of 1934 is about used up and indications are for the importation of considerable quantities to meet the demand for this most-used vegetable oil.

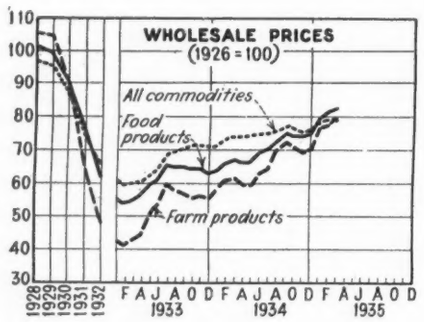
Fats and oils in general, however, are not moving into consumption as fast as in other years, and consequently prices have not moved upward as sharply as might have been expected in view of the curtailed supplies that are on hand and in prospect.

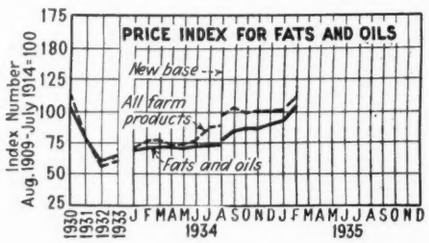
Confectionery Gains

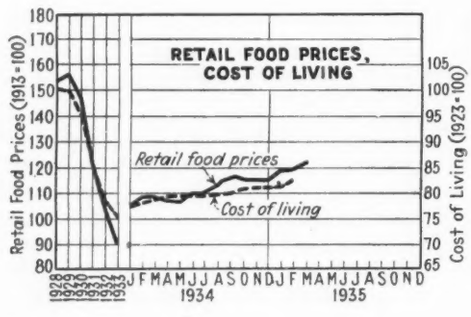
SALES of confectionery and competitive chocolate products in January, 1935, were valued at $16,697,185, compared with $11,726,374 in January, 1934, according to the Department of Commerce reports from 317 identical manufacturers. During 1934, total sales of these products were $202,892,000, an advance of 14.3 per cent over 1933. Thus the January record is a continuation of a trend established last year.

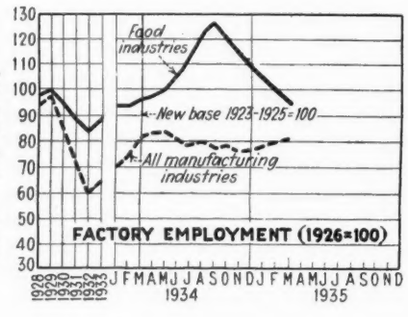
Did Repeal Lower Coffee Use?

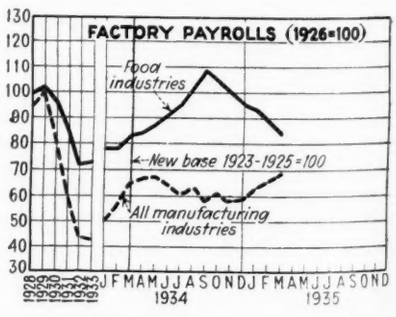
IN SPITE of the upturn indicated in the fall of 1934, total coffee deliveries in the United States for eight months from July 1, 1934 to Feb. 28, 1935, were 9.9 per cent off from the corresponding period a year ago. The "laid-end-to-end" men of the New York Coffee and Sugar Exchange figure this to mean that each American coffee drinker absorbed 16.3 less cups in 1934 than in 1933. Repeal is blamed for this daily ab-


WHOLESALE PRICES
(1926 = 100)
All commodities
Food products
Farm products
1928 1929 1930 1931 1932
F A J A O D F A J A O D F A J A O D
1933 1934 1935


PRICE INDEX FOR FATS AND OILS
Index Number Aug. 1909-July 1914 = 100
New base
All farm products
Fats and oils
1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934 1935


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913 = 100)
Cost of Living (1923 = 100)
Retail food prices
Cost of living
1928 1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934 1935


Food industries
New base 1923-1925=100
All manufacturing industries
FACTORY EMPLOYMENT (1926=100)
1928 1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934 1935


FACTORY PAYROLLS (1926=100)
Food industries
New base 1923-1925=100
All manufacturing industries
1928 1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J J A S O N D
1934 1935

Prices Continue Downward

TROUBLE-BREWING MANEUVERS in Europe, political and time-consuming tactics in Congress, and further liquidation of commodity prices have had a continued depressing effect upon business activity during the past month. Automobile production is still a bright spot in industrial activity. According to the *Business Week* index general business activity has fallen off to 62.6 per cent of normal for the week ending March 16; a decline of 0.95 per cent for the month.

STORM AND DROUGHT conditions in the Middle West are causing an advance in grain and meat prices. However, unexpected heavy catches of fish and the importation of butter and other foods whose high prices make importing profitable are pushing general food prices lower.

WHOLESALE PRICES reported by U. S. Department of Labor for foods declined 0.60 per cent during the month ending March 16. Those for farm products and all commodities show no change.

NEW YORK *Journal of Commerce* weighted price index shows a decline of 2.53 per cent in general index, of 5.05 per cent in grain prices, and of 3.13 per cent in food for four weeks ending March 23.

FUTURE food prices depend heavily upon weather conditions during the next month. Anticipated shortage of food has stimulated heavy planting for early market and devastation of winter wheat by heavy dust storms has resulted in removal of A.A.A. restrictions on spring wheat sowing.

stinence from the consumption of 0.05 cups of coffee per person.

Brazil, world's premier coffee producer, has followed this revelation from its best customer with immediate action. Steps have been taken, resulting in lower world coffee futures. Should this be translated into lower retail prices, Brazil stands to recover some of the lost market.

Sugar Stocks Lower

FOR the fourth consecutive year, world sugar stocks are lower, according to a recent compilation of Lamborn & Co. This report forecasts a world stock for August 31, 1935 of about 9,225,000 long tons, raw sugar. The falling off from the same date in 1934 is 7.6 per cent, and from the peak, in 1931, 25 per cent.

Reduction in stocks in 1935 will be caused by increased consumption, as an increase in production of one-fifth of one per cent, or 60,000 tons, is forecast. Consumption is expected to increase 247,000 tons or about 1 per cent.

Wheat Prospects

THAT CURTAILMENT of the 1934 wheat crop will have no effect on available flour supplies in the United States is indicated by the most recent report of General Mills, Inc., covering 90 per cent of the mills in the principal flour producing centers. This shows 42,437,534 bbl. produced since June 30, 1934, compared to 42,043,737 bbl. for the same period of the preceding year.

Continuation of normal milling and feeding activities may reduce the 427,700,000 bu. on hand Jan. 1, 1935, to such an extent that the carry-over, as of July 1, 1935, will be around 150,000,000 bu., according to the Bureau of Agricultural Economics.

Earlier in the year, a 1935 wheat crop of from 700 to 800 million bushels was forecast, which, with normal consumption of 625 million bushels, would have allowed for a normal carry-over in 1936 of 200 million bushels. With continued drought conditions in parts of the wheat belt, expectations are now somewhat less than the earlier forecast, and consequently, AAA has removed restrictions on the planting of spring what this year for those farmers under wheat allotment contracts who sign agreements to offset 1935 increases with corresponding decreases next year.

Construction News

	Pending (thousands)	Awarded March (thousands)	Total Awarded 1935 (thousands)
Bakery	$56	....	$57
Beverages	942	$511	1,690
Canning and Preserving	440	258	314
Confectionery	.....	....	....
Grain Mill Products	2,324	....	128
Ice, Manufactured	128	70	176
Meats and Meat Products	95	29	279
Milk Products	678	106	364
Sugar	.....	....	....
Miscellaneous	2 584	117	761
Total	$7,247	$1,091	$3,769

INDICATORS

CARLOADINGS, in spite of business improvement, continue to lag. While carlot shipments of foods are naturally off in the winter months, lcl. shipments are thought to fall below expectations because of increased truck competition.

DRIED FRUIT exports, low toward the end of 1934, have recently increased, particularly in prunes, apricots and raisins, lending a healthy tone to the domestic market.

CITRUS FRUIT production this season is forecast by the Department of Agriculture at 72,721,000 boxes of oranges and grapefruit, almost 20 per cent above last year and just below the 1930-31 record of 74,204,000 boxes.

NAVEL ORANGE crop in California this year is forecast at 17,355,000 boxes, largest since the 1928-29 crop of more than 20,000,000 boxes.

GRAPEFRUIT crop forecasts are for 11,000,000 field boxes from Florida; 1,740,000 boxes from California, and 2,460,000 boxes from Texas, nearly twice the preceding year, in spite of frost damage.

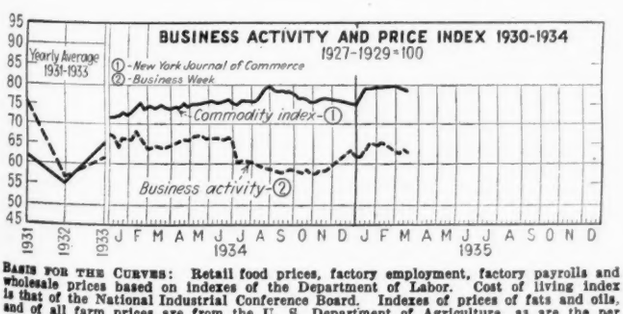
FISH supply continues one of the high spots in the country's food picture, with cold storage holdings at 51,574,000 lb., 59 per cent over 1934 and 15 per cent over the 5-year average.

FISH landings in New England, according to the latest report of the Bureau of Fisheries, are running 32 per cent above 1934 in quantity and 13 per cent in value.

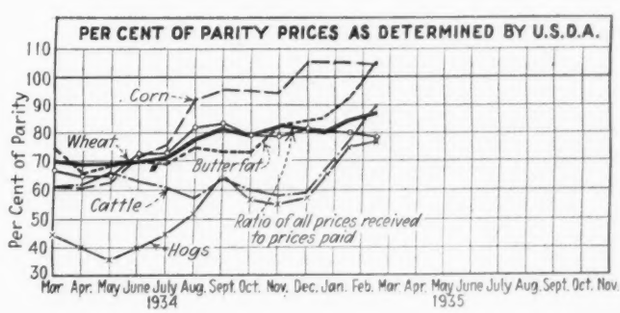
SNAP bean canning in Wisconsin in 1934 totaled 795,970 "standard" cases, an increase of 51 per cent over 1933, the state now standing third in production of beans for canning.

CATTLE from Canada are now reaching the New York market, together with small quantities of dressed beef, the first since 1929; and in spite of the high tariff.

SPRING LAMB crop prospects in March were good, though from 1 to 2 per cent below the same period of 1934, according to the Bureau of Agricultural Economics.



BASIS FOR THE CURVES: Retail food prices, factory employment, factory payrolls and wholesale prices based on indexes of the Department of Labor. Cost of living index is that of the National Industrial Conference Board. Indexes of prices of fats and oils, and of all farm prices are from the U. S. Department of Agriculture, as are the per cent of parity prices.


PER CENT OF PARITY PRICES AS DETERMINED BY U.S.D.A.
Per Cent of Parity
Corn
Wheat
Butterfat
Cattle
Hogs
Ratio of all prices received to prices paid
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.
1934
1935

Books Received

How to Package for Profit. By C. B. Larrabee. Published by Harper & Brothers, 49 East 33d St., New York, N. Y., 1935. 211 pp., 6¼x9½ in.; cloth; illustrated. Price, $3.50.

By raising and discussing points of production importance as well as of design correctness and construction fitness the author covers packaging in its many aspects. Family, novelty, and sample packages, closures, shipping containers, use of new packaging materials, inserts, and labels, and the role of packages on display, in advertising, and for re-use purposes constitute additional chapter headings. As Managing Editor of *Printers' Ink*, for which he has written a number of articles on packaging, and as co-author of "Packages That Sell," the author has evidenced a well-rounded conception of what constitutes effective packaging from the merchandising viewpoint.

Water Pollution Research.. Vol. VIII, No. 1 of Department of Scientific and Industrial Research. Published by His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C. 2. January, 1935. 26 pp., 6x9⅝ in.; paper; illustrated. Price 50 cents. Obtainable from British Library of Information, 270 Madison Ave., New York, N. Y.

World wide in scope these monthly summaries of current literature contain abstracts of original literature, including patents, on subjects pertaining to water supplies and their treatment for industrial uses. Abstracts Nos. 1-117 are included in this report; several apply to boiler-feed and brewing waters.

Statistical Abstract of the United States, 1934. Published by U. S. Dement of Commerce, Washington, D. C. 791 pp., 6⅝x9¼ in.; buckram. Price $1.50. Purchasable from Superintendent of Documents, Washington, D. C.

Compiled in the Division of Economic Research of the Department of Commerce this annual abstract of national statistics as they affect the United States commerce and industry is a reference book that should be in every food manufacturer's office. It should be consulted when raw material sources and supplies are being studied.

Condensed Milk and Milk Powder. Fifth Edition. By Otto Frederick Hunziker. Published by author, La Grange, Ill. 1935. 661+55 pp., 6¼x9¼ in.; cloth; illustrated. Price, $6.50.

Five editions of a book on a subject, all within twenty years, may seem quite a few but when the technology and equipment used in an industry change as rapidly as they have in the dairy industry, six to eight years between editions is not as short a period as it seems. Three new chapters in Dr. Hunziker's latest book cover phases of concentrated and dried milk processing that were practically unknown when the fourth edition of this book was published, in 1927. New knowledge on older phases has necessitated the rewriting of 25 other chapters.

So thoroughly has the author drawn upon the experience of others, as well as upon his own, that there are 290 references to existing literature.

Fundamentals of Dairy Science, Second Edition. By Associates of Lore A. Rogers, Bureau of Dairy Industry, U. S. Department of Agriculture. Published by Reinhold Publishing Co., 330 West 42d St., New York, N. Y. 1935. 616 pp.; 6½x9¼ in.; cloth; illustrated. Price $6.

Although commercial dairy processes are not dealt with in this monograph from an industrial point of view they are cited as applications of technical principles fundamental to the physical, chemical, and biological aspects of milk. As the revised edition of the American Chemical Society Monograph No. 41 this volume is an authoritative interpretation, as well as a compilation of scientific data related to the chemistry, physiology, bacteriology, and nutrition of milk and its products. It contains about a third more material than did the first edition. A list of reference citations at the end of each chapter makes this treatise of added value to the food chemist and technologist.

A Treatise on Baking, Second Edition. By Julius E. Wihlfahrt, in collaboration with Robert W. Brooks, Published by Standard Brands, Inc., 595 Madison Ave., New York, N. Y. 1934. 458 pp. 7⅝x10¼ in.; cloth; illustrated. Price $1.

From wheat to the many forms of bakery products, the contents of this treatise comprises a description of, discussion on, and direction for use of every type of raw material employed in the production of bakery goods. Also all processing steps and equipment and conditions incidental to processing, to rope and mold prevention, to bakery layout, organization, and operation, and to raw material and finished product handling and storage are included. As this compilation is in the nature of a handbook from the bakery service department of the publisher the formulas designate the use of those raw materials manufactured and merchandised by Standard Brands, Inc. That feature, however, need not detract from the value of this book to any food manufacturer engaged directly or indirectly in the production of bakery products.

The Chart of Plenty. By Harold Loeb and Associates. Published by The Viking Press, 18 East 48th Street, New York, N. Y. 1935. 180 pp., 5⅞x8½ in.; cloth. Price, $2.50.

Whether one is a supporter of the economy of abundance or of the economy of scarcity he cannot justifiably shut his eyes to the findings of The National Survey of Potential Product Capacity, which form the basis of this book. Financed by government funds and conducted by engineers and economists experienced in industrial enterprises this survey took into account the land, the natural resources, the man power, the industrial and agricultural plant, and the technological possibilities which would aid in the production of commodities for satisfying human needs if all factors were employed at reasonable maximum efficiency; if all man-power were employed and the agricultural as well as the industrial plant operated at capacity.

The resulting data are presented in the form of a master chart, designated as the Chart of Plenty, and it is the explanation of this chart which makes up the major portion of this volume. A preface by Stuart Chase and an interpretive introduction and conclusion give the findings of this survey a present day economic importance when our country is spotted with large areas of scarcity and with other areas of oversupply.

The interpretation of these data may be accepted or rejected as one wishes. However, not since the days of the War Industries Board Survey in connection with the World War has such a comprehensive factual survey been made of our national production resources.

Practical Everyday Chemistry. By H. Bennett. Published by Chemical Publishing Co. of New York, 950 Third Ave., Brooklyn, N. Y., 1934. 305 + XV pp., 6x8½ in.; cloth. Price $2.

To reach those who cannot afford to put $6 into such a handbook the publishers have made available this cheaper edition of The Chemical Formulary, Vol. I, reviewed in Food Industries, June, 1934.

Nutrition and Physical Fitness. 2d Edition. By L. Jean Bogert, formerly Instructor in Medicine, University of Chicago. Published by W. B. Saunders Co., Philadelphia, Pa. 1935. 566 pp., 6x8 in. cloth; illustrated. Price $3.

Increasing consumer interest in the nutritional value of foods necessitates that food manufacturers and technologists give more thought to the retention of the maximum nutritional qualities of their raw materials. Reading and studying the contents of such easily read and understood books on nutrition as this one, will help them to better understand what is likely to be demanded of their products by discriminating buyers who must consider the condition of their pocket-books as well as their stomachs.

Truck Selling. By Lars J. Sandberg, Instructor in Marketing. Published as Business Research Study, No. 7 by Graduate School of Business Administration, Harvard University, Soldiers Field, Boston, Mass. 1934. 34 pp., 7½ x11 in.; paper. Price $1.

Although truck selling of food by "wagon jobbers" involves less than 0.5 per cent of wholesale sales, these wholesalers are of great help to small manufacturers and to large manufacturers for perishable products. The more extensive use of truck selling is by food manufacturers who sell direct to retail stores. Both of these phases of truck selling are analyzed and discussed by the author.

IN THE CURRENT OF EVENTS

- *Experts discuss problems of packaging and baking*
- *Future of codes shaky, but new pacts go through*
- *Agricultural "Fascism" condemned at AAA hearing*
- *Food bill goes ahead with blessings of President*
- *Trade swap with Belgium benefits food industries*

Packaging Confab Big Success

WHAT was probably the most successful packaging conference and exposition in the five-year history of this division of American Management Association was held in Chicago, March 5-8. Outstanding among the features of the program was the recognition for the first time of the production aspect of packaging. An entire session was devoted to the subject under the leadership of Francis Chilson, consulting production engineer. Another session was devoted to packaging materials.

Progress review day and marketing day attracted large audiences, as usual, but production and materials sessions drew just about as much attention. The packing and shipping conference and clinic surprised everyone, pulling the biggest crowd. Evidently, shipping offers the greatest problems to manufacturers. At the "then and now" symposium, representatives of some twenty manufacturers demonstrated old and new packages and told why and how the changes were brought about.

One feature of previous conventions was missing here—the large number of artists and designers who formerly participated in discussions on what was or was not good design. This was a business man's and production man's convention.

Pointers on Packaging

HIGHLIGHTS on the production day of the packaging convention were the pungent comments by Francis Chilson. He said that 90 per cent of the difficulties in any factory occur in the packaging department. He also laid great stress on the inaccuracy of the notion that the artistic design is responsible for the outstanding success of many new packages. More often, he declared, repackaging is accompanied by better sales promotion, more advertising expenditure and improvement in the product itself. Credit, he insisted, should go to the product and not to the package for repeat sales.

Standard vs. special machinery for package production was discussed by George F. Pond, Pneumatic Scale Corp., who advised the use of standard machinery as far as possible. An important thought was that the amount of money which it is economic to spend for automatic equipment is the annual labor cost multiplied by three, four or five, usually four.

AGAIN HEADS INDUSTRY
William F. R. Murrie, head of Hershey Chocolate Corp., Hershey, Pa., who again has been chosen president of Association of Cocoa and Chocolate Manufacturers of the United States.

Lee Ferguson, J. L. Ferguson Co., emphasized his well-known philosophy that the smaller the package the bigger the profit for the manufacturer. Managers should also consider the effect on their products of changes of altitude which result in barometric pumping and changes in moisture content of the product.

Proper protection of the product by using the correct wrapping material and methods of testing the package were brought out with many demonstrations by Dr. G. F. Des Autels, Kalamazoo Vegetable Parchment Co. A highlight was his account of the disastrous result of over-protection of a product, e.g., ham, which molded because no escape of water vapor was permitted.

F. C. Chase, E. R. Squibb & Son, presented a paper on "How Adjustability of Machinery Affects Packaging Costs." His thesis was that equipment should be such that any plant superintendent could say to his sales manager, "We can handle any reasonable change you feel advisable in a package." His suggestions for the future development of packaging lines and machinery involved hanging it from the ceiling, compacting lines into vertical space, and using more all-purpose, high-speed machines so that large and small manufacturers will have similarly low package-production costs.

Exhibitors at the exposition reported an unexpectedly large number of sales.

Copeland Bill Moves On

FOOD and drug legislation is moving on its way to enaction, supported by a Presidential message to Congress. The Copeland bill, which the Administration favors, has passed through public hearings, now is in the stage of S.5 (Report No. 36) and has gone on the regular Congressional calendar to come up in "several" weeks. Objectors apparently will have time to make themselves heard before Congress moves to enact the measure.

In a move to further the prospects of his food and drug bill, Representative Mead has introduced an amendment which provides that the Secretary of Agriculture need not move against violators if he thinks a warning would accomplish the purpose.

Concessions by Belgium

AGAIN the food industries have profited through a reciprocal trade agreement negotiated by the Department of Commerce. Made with Belgium and effective April 1, the pact grants concessions to the United States on the following food items: honey, lard, entrails, rice, oatmeal, corn starch, dried apricots,

grapefruit, dried peaches, fresh and dried pears, fresh and dried apples, prunes, pork, canned pork tongues, canned pilchards and canned fruits. Concessions were made by the United States on flavoring extracts, hothouse grapes, prepared or preserved peas, endives and crude chicory.

Courts Upset Milk Control

Two more federal courts have ruled unconstitutional intrastate control of milk by AAA, and the Supreme Court has decided that New York State has no right to fix, through a milk-control law, the price of milk produced outside the state and sold within it. The federal court rulings adverse to the AAA program affect the milk licenses of Los Angeles and Providence, R. I. Both decisions likely will be appealed by AAA, but their effect is forecast by the recent action of AAA in terminating the milk licenses in Chicago, Baltimore and Oklahoma City. Court orders restraining the licenses had been issued in all these cities. The AAA also recently terminated the license at Port Huron, Mich., supposedly because it never has been fully effective.

Bakery Engineers Trade Ideas

THE twelfth annual meeting of American Society of Bakery Engineers, held in Chicago, March 11-14, was the largest ever held, over 600 persons being registered. Outstanding feature was that this group, although primarily interested in production, devoted an entire evening session to the long-time decline in per-capita wheat consumption in the United States.

The engineers are now familiar with one of the most fundamental trends affecting their industry—declining consumption. And repeatedly it was emphasized that production men have it within their power to produce quality that will change impulse purchases by consumers into repeat purchases.

Stanley Kretchman of A. & P., Chicago, discussed sugar, showing how, in addition to sweetness, it possesses other inseparable effects. For example, sugar has a softening effect in breads. It is impossible to produce a hard sweet roll. In cake, too much sugar affects the gluten structure so much that it will "fall." The use of sugar in bread is increasing: ten years ago, 8 or 10 lb. per 100 lb. of flour would have been considered foolish. Today it is practical. Samples of bread containing 6, 7 and 8 per cent of sugar (flour basis) were indistinguishable.

However, if sugar is increasing, the use of dry skim milk is going ahead by leaps and bounds. Washington Platt of Borden's exhibited two new breads of high milk content. One, "School Lunch Bread," contained 12 per cent of dry skim milk solids. The other, an experimental bread, contained 30 lb. of d.s.m. per 100 lb. of flour, which is much more milk solids than fluid milk contains. The upper limit of milk addition seems to be at 35 per cent. High-milk breads must be mixed three times as long as regular breads. Cost per pound of dough is no higher than in regular formulas.

Rowland J. Clark of Grand Rapids told of his experiments in baking 5,000 cakes to discover the principles underlying the balancing of formulas. Variables used were sugar, water, shortening and dry skim milk. In general, almost any amount of d.s.m. solids will make a good cake if the formula is properly balanced. With increases of d.s.m., the amount of water increases but sugar decreases. A given flour appears to have a very definite sugar requirement for cake baking, and the formula needs to be rebalanced every time a new car of flour is purchased.

Tests of cake batter show a decrease of plasticity with increasing amounts of sugar until a minimum is reached after which plasticity increases. That amount of sugar which produces the minimum of plasticity produces the best cake.

J. G. Coffin of General Baking Co. discussed power and fuel, and gave the following average figures from his experience:

Average Relative Cost of Fuel in Baking[1]

Source of Heat	Cost	Unit	Cost per 1,000 lb. of Dough Baked
Artificial Gas	$0.60	1,000 cu. ft.	$0.63
Natural Gas	0.26	1,000 cu. ft.[2]	0.24
Electricity.	0.015	kw.-hr.	1.80
Oil.....	0.04	gallon	0.20 —$0.32

[1]These figures represent average relationships. Local conditions govern the unit cost of fuel as well as the actual cost of fuel per 1,000 lb. of dough baked.

[2]An unexplained anomaly occurs in the experience with natural gas. It has double the B.T.U. value of artificial gas, yet it requires about the same amount of gas to bake 1,000 lb. of dough.

A. A. Schaal of Lever Bros. and Benjamin Zenlea of Rockwood & Co. presented papers on the rôle of chocolate and cocoa in cake and showed that bakers' devils food cake is often too much on the alkaline side, that the soda-cocoa ratio is the essential factor controlling color and flavor.

BAKERS' CHOICE

F. B. Evers, elected president of the American Society of Bakery Engineers.

Officers for the ensuing year are: president, F. B. Evers, American Bread Co., Nashville, Tenn.; vice-presidents, W. J. Ocken, National Tea Co., Chicago, and Charles P. Oliver, Borden Co., New York; secretary, Victor E. Marx, *Bakers Helper*, Chicago.

Codes May Be Dropped

WITH the Administration planning to throw into the waste-basket 550 of its 731 compulsory codes, the future of fair-trade-practice agreements in the food industries is uncertain. There is a possibility that the codes of some 20 of the smaller manufacturing groups will be dropped, these industries being placed under codes for the larger trades or under the approved but inoperative master-food code.

New Codes; Amendments

DESPITE the uncertainty of the code situation, two more food codes have been approved and changes have been made in some already in operation. The new codes cover the Mid-west fish and shellfish preparing and wholesaling industry and the Middle-Atlantic preparing and wholesaling fishery industry. Both establish a 40-hour week and a weekly wage for non-office employees of $20 in cities of a million population (less in smaller towns).

Outstanding among the code changes was the transfer of the flour-milling code to the single jurisdiction of NRA, completely divorcing it from AAA. By an alteration of the canning code, exemption from code assessments has been denied firms whose principal line of business is in some other line of industry but which pack in excess of 6,000 cases of canned foods.

An amendment to the candy code outlaws the granting of credit, other allowance or replacement beyond six months from date of shipment when candy is returned because of defects in package, quality or appearance.

Requests for approval of amendments have gone to NRA from various other industries. Both the bakers and the manufacturers of package and pasteurized-blended and processed cheese seek permission to liquidate damages. Macaroni manufacturers have been trying to abolish premiums, but no action has been taken on this by NRA since the hearing a month ago, and it probably will not go through.

The labor code which the Administration attempted to saddle upon the fluid-milk industry is practically a dead issue and more than likely will be dropped. The dairy industry unanimously opposed it from the start.

New Standards for Canners

CANNED soaked peas having been ruled a different class of food from immature peas by the Supreme Court of the District of Columbia, the Food and Drug Administration has drawn up separate standards for this product. The proposed standard of quality and condition reads: "Standard canned dry peas are the normally flavored and normally colored canned food consisting of a thoroughly cooked, mature, unbroken seed of the common or garden pea, with or without seasoning, and with added potable water. This product is practically free from foreign material." The standard for fill of container stipulates that the added liquid is excessive when the proportion of free liquid is such that, when the contents of the container are poured out and poured back, the liquid completely covers the peas after standing 15 seconds. This same standard of fill is proposed for canned peas.

Under the proposed standards, canned dry peas must be distinguished from canned immature peas by the label "dry peas." If desired, the expression may be qualified by some descriptive term such as "soaked" or "cooked."

Also of interest to canners is a change in standards for canned spinach. This is to the effect that spinach in No. 10 cans will not be regarded as containing excessive packing medium unless the cut-out weight falls below 60 oz.

"It's Fascism!"

FOOD manufacturers testifying at hearings on the proposed AAA amendments last month were unanimous in their opposition. Practically without exception they shuddered at the thought of a Secretary of Agriculture with unbridled power to license industries. The more mild-spoken food-field representatives called it regimentation, but Clarence Francis, spokesman for Associated Grocery Manufacturers of America, labeled it Fascism.

"Under the proposed amendments," Mr. Francis declared, "it cannot be denied that a manufacturer, handler or distributor may be forced under a marketing agreement which he had no hand in drawing, which he honestly feels is unworkable and bad, and which may force him either to operate his business at a loss or to liquidate. ... Whether we like the word or not, it is plainly a Fascist approach to the problem."

Equally condemnatory was George E. Putnam, representing Institute of American Meat Packers. These amendments, he said, would permit the Secretary of Agriculture, with approval of the President, to fix prices both to farmers and consumers, to fix sales quotas for processors and even stop price competition among processors. The Secretary could go so far as to allot certain regions of the country to certain processors, eliminate advertising as a useless waste and fix profit in the meat packing industry, Mr. Putnam held.

Speaking on behalf of National Canners' Association, H. T. Austern asserted that the so-called "limitations" on the absolute licensing powers of the Secretary of Agriculture were so drafted as to leave the licensing power entirely to the judgment of the Secretary and preclude effective court review.

Representatives of other food industries expressed about the same opinions as those already mentioned, but Chester C. Davis, AAA administrator, said, in effect, that they all were excited about nothing because the proposed amendments were intended merely to clarify the present powers of AAA and not to set up a dictatorship over the agricultural products industries.

Despite all the opposition, the AAA amendments are expected to be enacted, Washington observers report; but they may be altered somewhat to limit their scope.

PUBLIC PROTECTOR

Mrs. Emily Newell Blair, who has been appointed chairman of the Consumers' Advisory Board of NRA. Active on the board since the first days of NRA, she was associated with the late chairman, Mrs. Charles Cary Rumsey.

Conventions

APRIL

11-12—Tri-State Packers, spring meeting, Lord Baltimore Hotel, Baltimore, Md.

28-30—Bakery Sales Association, Ambassador Hotel, Atlantic City, N. J. Russell Elmquist, 1135 Fullerton Ave., Chicago, secretary.

MAY

6-8—Southern Bakers' Association, Tutwiler Hotel, Birmingham, Ala. T. H. Fitzpatrick, 518 Chamber of Commerce Bldg., Birmingham, secretary.

14-15—Central Atlantic States Association of Dairy, Food and Drug Officials, annual meeting, Richmond, Va. Ferd. A. Korff, Baltimore City Health Dept., secretary.

22-25 — American Oil Chemists, Society, annual meeting, Peabody Hotel, Memphis, Tenn. John C. P. Helm, 509 Tchoupitoulas St., New Orleans, La.

Higher Standards for Cream

MOVEMENTS are afoot in many forms to improve the quality of cream used in the manufacture of butter. Purchase of cream on a graded basis, with corresponding grade labeling of butter, is sought in a butter marketing agreement proposed for eleven West Coast and Mountain states. To the same end, the Bureau of Agricultural Economics recently issued the following tentative U. S. grades for churning cream: AA, A, B, C, D and Reject Cream.

As a means of standardizing cream, American Association of Creamery Butter Manufacturers has tentatively adopted a standard sediment test. This provides that a 4-oz. sample of cream be used, that the tester have a filtering surface of 1½ in. effective diameter, and that the filtering material be of nainsook cloth of 120x120 mesh.

Concentrates

EFFECTIVE April 1, a processing tax of 1 cent a pound will be levied on rice, with exemption for floor stocks and refunds on exports and rice used for relief. . . And amended marketing agreement for the evaporated milk industry, tentatively approved by Secretary Wallace, abolishes maximum and minimum resale price lists. . . Tentative approval has been accorded a marketing agreement for canning asparagus in California, this being similar to the one in effect last year.

THE brewing code recently was declared constitutional by a federal judge of the western district of Missouri in a case involving the lending of fixtures to retailers. . . A circuit court judge has upheld the $1,500 annual license tax levied on non-resident brewers by St. Louis. . . Many small meat packers are seeking to sell to members of the "Big Four," it is reported, because of mounting working capital needs, competition in obtaining supplies, higher overhead costs and high current cutting losses.

UNIFORM laws for fishing on the Great Lakes must be enacted if the freshwater fish industry is to be saved, Frank T. Bell, Commissioner of the Bureau of Fisheries, contends. . . Vitamin D milk can be distributed in New York after June 1.

GERMANY has prolonged until July 31 the reduced import duty of 40 Reichsmarks per 100 kilos on lard and oleomargarine. . . Great Britain has restricted May and June imports of cured pork to 103,216,000 lb., a reduction of 23.5 per cent. . . Mexico has increased its import duty on condensed, evaporated and powdered milk from 20 to 40 centavos per kilo, this to become effective March 1.

Men . . . Jobs . . . and Companies

Industry

• ARMOUR & Co. has purchased Brown Bros. & Co., Indianapolis, and is expected to take over Jacob E. Decker & Sons Packing Co., Mason City, Ia., owned by Adolph Gobel, Inc.

• BORDEN FARM PRODUCTS Co., New York, is distributing a complete line of bacon and hams. If this venture is successful, other meat items will be added.

• CANADIAN SUGAR FACTORIES, LTD., will build a new beet-sugar factory with a 200,000-ton capacity, at an estimated cost of $1,000,000. The plant will be near Lethbridge, Alberta.

• CARNATION MILK PRODUCTS Co. recently took over the Jelke milk plant at Hillsboro, Wis.

• CROSSE & BLACKWELL, LTD., of Canada, will turn over its sugar plant to National Sugar Refining Co., and negotiations are under way for the sale of the company's canning business.

• DOUGHNUT CORP. OF AMERICA, New York, has constructed at Chickasha, Okla., a second egg drying plant which more than doubles its output.

• GEORGE A. HORMEL Co., Austin, Minn., is now canning chile con carne.

• KRAFT-PHENIX CHEESE CORP., Chicago, recently opened three new plants, and it will construct seven more this year. Much of this expansion is in the South.

• KROGER GROCERY & BAKING Co. is erecting at Columbus, Ohio, a new cracker bakery to cost $75,000.

• C. C. LANG & SONS, Baltimore, recently acquired the pickle plant of Helwig & Leitch Corp. at Elizabeth City, N. C.

• LAYTON Co., Milwaukee, has been purchased by Plankinton Packing Co., Swift & Co. subsidiary. The deal involved $500,000.

• LIBBY, MCNEILL & LIBBY is building a new cannery in Walla Walla, Wash., this to cost more than $200,000.

• LOOSE-WILES BISCUIT Co., Long Island City, N. Y., recently purchased the candy equipment of Mueller Keller Co., St. Joseph, Mo. The Mueller Keller factory has been taken over by Jersey Cereal Co.

• MAIER-ROEDEL BAKING Co., INC., Chicago, is spending $50,000 on new equipment.

• MERRILL SOULE Co. has bought the Borden Co. condensery at Sinclairsville, N. Y., and will use it as a receiving station for milk.

• NATIONAL PECAN MARKETING ASSOCIATION has established at Macon, Ga., a shelling plant which will handle 200,000 lb. of the 1934 crop.

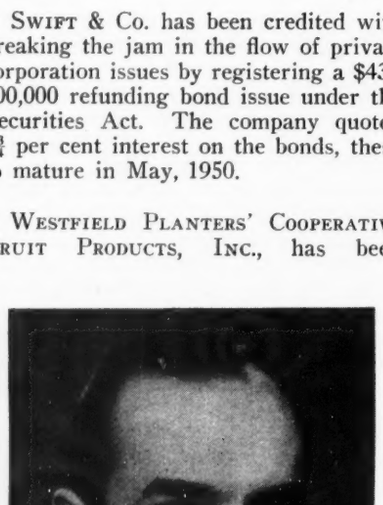
• SNIDER PACKING CORP., Rochester, N. Y., will spend $150,000 in an expansion program at its Mount Morris cannery.

• STANDARD BRANDS, INC., New York, has opened a new office building and a 40-car garage in Allentown, Pa.

• SWIFT & Co. has been credited with breaking the jam in the flow of private corporation issues by registering a $43,000,000 refunding bond issue under the Securities Act. The company quoted 3¼ per cent interest on the bonds, these to mature in May, 1950.

• WESTFIELD PLANTERS' COOPERATIVE FRUIT PRODUCTS, INC., has been chartered to take over and operate the former Armour & Co. grape juice and fruit products factory at Westfield, N. Y.

• WILSON & Co. is manufacturing a new cocktail frankfurter.



JOHN M. SHARF

Recently appointed director of the A.B.C.B. Laboratory, maintained by American Bottlers of Carbonated Beverages, Washington, D. C., he will carry on the work done during the past four years by Dr. Julian H. Toulouse. Mr. Sharf has been engaged in post-graduate work in Germany and England.

Personnel

• OSCAR ADAMS now is manager of Dixie Baking Co., Abilene, Texas.

• W. E. BECKNER, since 1928 a flour buyer for Kroger Grocery & Baking Co., has joined Bakers' Service Bureau, Inc., New York.

• WALTER BERRY, Kalamazoo, is the new president of Michigan Bottlers of Carbonated Beverages.

• PAUL H. BIMMERMAN has become president of Texas Flour Mills Co., Dallas, succeeding J. E. Haviland.

• E. E. CHASE now heads up Canners' League of California, San Francisco.

• EDMUND S. CHILDS, who was head of Childs, Sleeper & Co., Boston, has joined Batchelder & Snyder Co., Inc., as vice-president and a director.

• N. G. DESSERT, Detroit, recently was made president of Michigan Association of Ice Cream Manufacturers.

• R. J. DICK has succeeded E. J. Pitcher as manager of the Providence (R. I.) plant of H. J. Heinz Co., Mr. Pitcher having been transferred to Pittsburgh.

• KELCY FAUST recently was made manager of the Erick, Okla., plant of Armour & Co.

• JOHN P. GIBBONS, Hamlet, N. C., succeeds Charles V. Rainwater, resigned, as chairman of the code authority for the bottled soft drink industry.

• GEORGE HICKS has been appointed manager of the Talequah, Okla., branch of Fairmont Creamery Co.

• J. O. HICKS has been put in charge of a new branch of Quaker Oats Co. at Little Rock, Ark.

• A. L. HOTTINGER, Sheridan, Ind., will manage Gas City (Ind.) Canning Co. during the coming year.

RALPH O. DULANY
An executive of John H. Dulany & Son, Fruitland, Md., he recently was elected chairman of the new code authority of the canning industry.

• FRANK A. KEMP succeeds the late W. D. Lippitt as general manager of Great Western Sugar Co., Denver. A vice-president and member of the board, Mr. Kemp will be in line for the presidency at the next annual meeting of the company.

• GEORGE A. KURK has been chosen to head up Nebraska Ice Cream Manufacturers' Association during the coming year.

• A. J. LANKFORD now is manager of the Montgomery (Ala.) branch of George A. Hormel & Co.

• STEPHEN H. LOVE recently was elected vice-president of Utah-Idaho Sugar Co., Salt Lake City.

• O. E. LOWELL has been chosen president of Gibbon (Nev.) Canning Co.

• J. P. MARISH now is manager of the Domestic Egg Products Co. plant at Chickasha, Okla.

• E. G. MONTGOMERY, executive secretary of the canning code authority, resigned recently to go back to NRA. O. P. Hopkins is acting executive secretary.

• RALPH B. MORRIS, Standard Brands, Inc., New York, has been elected president of Holes-In-Bread Club.

• HERMAN NELSON has become president and general manager of Hydrox Ice Cream Co., St. Louis. Formerly secretary-treasurer, he succeeds C. T. Hubbell, who went with Luick Dairy, Milwaukee.

• GEORGE T. PECKHAM, manager of Consolidated Factories, National Candy Co., St. Louis, now is chairman of the industrial board of National Confectioners' Association. He succeeds George H. Williamson.

• LEVIN PHILLIPS has been reelected president of Maryland Bottlers of Carbonated Beverages.

• FRANK ROSS, for eight years manager of Fremont (Neb.) Mills, has moved up to manager of the Grand Island (Neb.) plant of Nebraska Consolidated Mills Co. He is succeeded at Fremont by Merle Hasson.

• BERT M. RUSE recently was elected president of Bridgeman-Russell Co., large Duluth dairy firm, to succeed the late N. F. Russell. For ten years he served as vice-president and general manager.

• J. C. RYAN has been named president of Dugger Van Zant Packing Co., Noblesville, Ind.

• GEORGE S. O. SMITH recently was made head miller of Dixie-Portland Flour Co., Higginsville, Mo.

• MAX H. SOBEL, prominent figure in the confectionery manufacturing field, has formed his own company, M. H. Sobel, Inc., Chicago.

• G. A. WIESEHAHN is launching a research program for Glidden Co. in connection with its new Chicago soy-bean plant.

• EARL C. WILDER now has charge of research activities at Craig's Bakery, Inc., Columbus, Ga.

• H. H. WITHERSPOON has been elected vice-president in charge of purchasing, advertising, transportation and casings for Pittsburgh (Pa.) Provision and Packing Co.

Deaths

• LEWIS M. BORDEN, 55, a director of Borden Co., New York, Feb. 24. He was a grandson of Gail Borden.

• ROBERT A. BOWMAN, 80, president and one of the founders of Bowman Dairy Co., Chicago, at Cristobal, C. Z., March 12.

• LOUIS W. BORNWASSER, 45, president and general manager of Emmart Packing Co., Louisville, Ky., Feb. 28.

• J. J. DAU, 90, chairman of the board of Reid, Murdoch & Co., Chicago, March 14. He was with Reid, Murdoch 60 years.

• CARL L. ENGELS, 70, president of Engels & Krudwig Wine Co., Sandusky, Ohio, recently.

• CLIFFORD S. HEINZ, 52, vice-president and a director of H. J. Heinz Co., Pittsburgh, March 19.

• FREDERICK W. JANSSEN, SR., 65, founder and president of Janssen Dairy Products Corp., Hoboken, N. J., Feb. 24.

• JOHN B. LANERI, 77, president of Fort Worth Macaroni Co., recently.

• ERNEST LINDSEY, 64, founder of N. B. Lindsey Co., biscuit manufacturers, Marblehead, Mass., March 3.

• BENJAMIN S. PEARSALL, 68, president of B. S. Pearsall Butter Co., Elgin, Ill., March 1.

• WILLIAM B. PETTY, 41, owner of Nehi Bottling Co., Corinth, Miss., Feb. 21.

• JACOB SCHLACHTER, 63, secretary and treasurer of Jacob Schlachter Sons Co., Cincinnati meat packers, Feb. 25.

• WILLIAM G. TODD, 50, controller of Hoffman Beverage Co., Newark, N. J., March 13.

• ADAM C. WAGNER, president of Yale Brewing Co., New London, Conn., and a famous brewery engineer, recently.

• M. L. WALLDORFF, 72, treasurer of Acme Milling Co., Olean, N. Y.

Associated Industries

• MILPRINT PRODUCTS CORP., Milwaukee, announces that John J. Doheny has been added to its staff to take charge of the meat packing and dairy divisions.

• READING (PA.) IRON CO. has established a commercial research department to serve (without charge) its pipe buyers.

• REPUBLIC STEEL CORP. has appointed Atlas Supply Co., Inc., Brooklyn, N. Y., as warehouse distributors of Toncan iron sheets.

• SPROUT, WALDRON & CO., INC., Muncy, Pa., has appointed Conite Engineering & Sales Co., Nashville, as sales agents.

• C. J. TAGLIABUE MANUFACTURING CO., Brooklyn, N. Y., has opened a new factory at Dallas to take the place of its Shreveport branch.

PATENTS

Coffee Roasted, Ground and Packed in Atmosphere of Roaster Gases—Dick R. McLain, Larchmont, N. Y. and Herman Simmonds, Jr., New York, N. Y. No. 1,991,564. Feb. 19, 1935.

Yeast Preserved and Dried in Mixture With Aerated Calcium Sulphate Cream—Henry Riley, Kearny, N. J.; Edith Riley, Administratrix. No. 1,991,629. Feb. 19, 1935.

Casein of Low Acid and Ash Content Precipitated From Skim Milk—Frank L. Chappell, Hobart, N. Y., to Sheffield Farms Co., Inc., New York, N. Y. No. 1,992,002. Feb. 19, 1935.

Egg-Meats Mixed With 13 per cent Salt, 10 per cent Sugar and Stored at —5 to 0 deg. F.—Hans W. Vahlteich and Jacob L. Schille to The Best Foods, Inc., New York, N. Y. No. 1,992,263. Feb. 26, 1935.

Milk Extracted From Coconuts by Mechanical Means—Santiago Estrada, Enrique Mauri, and Armando Ivey, Havana, Cuba. No. 1,992,479. Feb. 26, 1935.

Buckwheat Grains Flaked After Treatment With Monohydric Alcohol or Fruit Acids and Steaming With Water Vapor—Rinjiro Sasaki, Oaza Sendagaya, Sendagaya-Machi, Toyotama-Gori, Tokyo, Japan, to Zaidan Hojin, Ryoshoku Kenkyu-Kwai, Tokyo Prefecture, Japan. No. 1,992,582. Feb. 26, 1935.

Glutamic Acid Compounds Prepared From Corn Press Cake by Digesting the Zein With Hydrochloric Acid—Edward Bartow and Raymond L. Albrook, Iowa City, Ia., to A. E. Staley Manufacturing Co., Decatur, Ill. No. 1,992,804. Feb. 26, 1935.

Atomized Butter Fat Incorporated Into Lactic Acid Cultured Skim Milk Having an Acidity of at Least ½ per cent and Maintained at a Temperature Not Higher Than 75 to 80 deg. F.—Herbert E. Otting, Westerville, Ohio, to M. & R. Dietetic Laboratories, Inc. No. 1,992,836. Feb. 26, 1935.

Combination Ice Cream Mixing and Freezing Unit—Lester A. Ballew, Johnson City, Tenn. No. 1,993,130. March 5, 1935.

Fats and Fatty Materials Stabilized by Use of Phosphoric Acid and Its Derivatives as Anti-Oxidants—Eddy W. Eckey, Wyoming, Ohio, to Procter & Gamble Co., Cincinnati, Ohio. No. 1,993,152. March 5, 1935.

Quality Depends on Temperature

(Concluded from page 191)

the same ways as recommended for milks and butters.

Whole and skim milk cheeses are attacked principally by cheese skippers, cheese mites and rodents. Skippers and mites do not attack cheese in cold storage; but skippers, when once established, will survive a temperature of 32 deg. F. for three months and resume activities when again warmed up. Rodents will often do considerable damage at any usual holding temperature.

The adult skipper (fly) being similar to the ordinary house and stable flies, and breeding also in hams, bacons, stale meats, and unsanitary places, may be present in normal storage rooms in large numbers without being noticed. If cheese is placed in such rooms for curing, it soon becomes infected. The eggs of these flies hatch quickly and the maggots (skippers) immediately enter the cheese, when they may cause considerable damage before the cheese is used up. Infested cheeses show sunken spots on the surface, beneath which the skippers are turning the material into a soft, stringy state. Such infested parts are unfit for food and should be pared off and destroyed. When an infestation is established in stored cheese, fumigations of the entire room is advisable, although in small, isolated infestations the material may sometimes be treated and the sections thoroughly cleaned, then sprayed with a fumigant spray (see page 160, FOOD INDUSTRIES, April, 1934). The principal control for cheese skippers, however, is general sanitation.

Cheese mites will often congregate in vast numbers on the surface of cheeses and may be detected by the presence of a brown dust. Mites dry the surface, cause it to crack, and thus facilitate the entrance of skippers. Mite infestation usually arises from unsanitary surroundings and requires the same prompt and thorough treatment recommended for skippers.

Eggs

CONTAINERS

For frozen eggs, use loose-top tin cans.

For shell eggs, use wooden crates with cardboard separators.

For powdered eggs, use tin-lined wooden boxes, or paper-lined, slack-coopered barrels.

SHIPPING

Powdered and shell eggs should be shipped in clean, dry vehicles.. If powdered egg containers show signs of moisture, the contents should be carefully inspected. If shell egg cases are damaged, or show leakage, all broken eggs should be removed immediately and the balance used up promptly or placed in cold storage.

Frozen eggs must be shipped in refrigerated vehicles, cooled so as not to permit a rise of more than 20 deg. F. outside the cans during transit. Because of the comparatively light weight of the containers, and looseness of the lids, such cans as appear to have been damaged in handling, or those with lids loosened or removed, should be inspected and set aside if the contents appear in any way affected.

STORAGE

Powdered eggs may be stored in a cool, dry place for 30 days, but if held for longer periods, a temperature of 32 deg. F. should be used. When once held at 32 deg. F. they should not be removed until just before using.

Shell eggs may be stored at 32 deg. F. for 30 days or less. For longer periods, a temperature of 28 to 30 deg. F. should be used.

Frozen eggs must be held at 0 deg. F. until just before use. They should be ordered from storage each day as required. No more than a two-day supply should ever be on hand at any one time. Frozen eggs should be handled so as to be 80 per cent thawed when needed, but must never be permitted to thaw completely. Thawing should occupy 18 to 22 hours in normal temperature when the cans are separated so that air can circulate about them, and from 22 to 26 hours when cans are close together. After the contents of each can is thawed, it should be examined for musty or bad egg odors, and discarded if contamination is evident.

While 32 deg. F. storage will prevent the eggs from thawing, it is not sufficient to stop the comparatively rapid decomposition that develops in frozen eggs above 0 deg. F., therefore it should never be depended upon as an egg-holding temperature.

PEST CONTROL

Eggs, in any form, are seldom troubled by insects or rodents when properly stored and handled. They are, however, very susceptible to attack by mold and bacteria.

Powdered eggs, properly handled, are dry enough to prevent mold and bacteria growth, but are quickly damaged beyond repair if permitted to become even slightly moist. This is especially true in normal storage and, to a lesser degree, at any temperature above zero.

Shell eggs are not as sensitive to slight changes in temperature and moisture as are other forms. However, there is always a certain unavoidable deterioration occurring within them, proportionate to the holding tempertaure. Therefore, extended storage should be avoided, if possible.